Group B *Streptococcus* Surveillance Report 2006

Oregon Active Bacterial Core Surveillance (ABCs)
Office of Disease Prevention & Epidemiology
Oregon Department of Human Services
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Background

Active Bacterial Core surveillance (ABCs) is a core component of the Emerging Infections Program (EIP) Network sponsored by the Centers for Disease Control and Prevention (CDC). The purpose of ABCs is to determine the incidence and epidemiologic characteristics of invasive disease due to *Haemophilus influenzae*, *Neisseria meningitidis*, group A *Streptococcus* (GAS), group B *Streptococcus* (GBS), and methicillin-resistant *Staphylococcus aureus* (MRSA). The entire EIP Network represents 39.5 million persons in 10 surveillance areas around the United States. More information on the EIP/ABCs Network is found at: http://www.cdc.gov/ncidod/dbmd/abcs.

In Oregon, the surveillance area for invasive GBS disease comprises the Tri-County (Clackamas, Multnomah, and Washington) Portland metropolitan area with a 2006 estimated population of 1,569,170. More information on the Oregon ABCs program is found at: http://oregon.gov/DHS/ph/acd/abc.shtml.

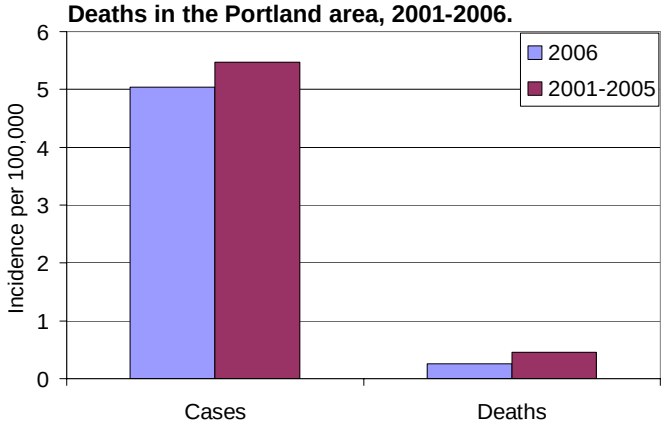
Methods

Invasive disease is defined as the isolation of GBS from a normally sterile body site in a Tri-County resident. Tri-County hospital laboratories submit GBS isolates to the Oregon State Public Health Laboratory, from where they are forwarded to CDC for serotyping and susceptibility testing. Additional cases are identified through regular laboratory record reviews. Health record reviews of each case allow standardized reports of demographic characteristics, clinical syndrome manifestations, underlying conditions, and illness outcome. Early-onset disease is defined as invasive GBS disease occurring in infants less than seven (<7) days of age; late-onset disease is defined as invasive GBS disease occurring in infants from 7 to 89 days of age.

Surveillance Results

Descriptive Epidemiology

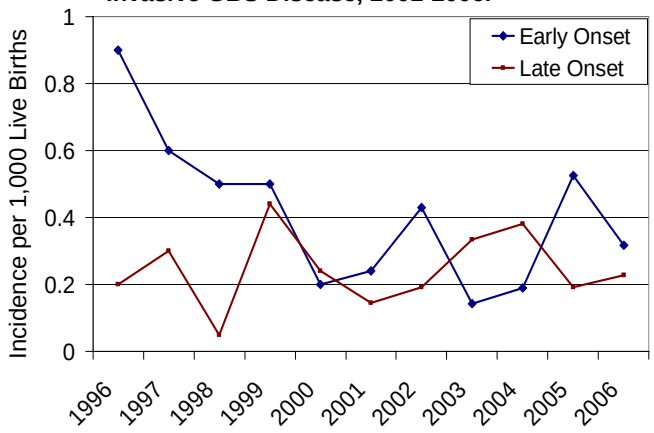
Figure 1: Incidence of Invasive GBS Cases and Deaths in the Portland area, 2001-2006.



In 2006, 79 cases of invasive GBS disease were reported in the Tri-County Portland area, corresponding to an incidence rate of 5.0/100,000 persons (Figure 1). This is 9% lower than the average annual incidence rate in the Portland area from 2001–2005 (5.5/100,000) and lower than the 2006 national projection of invasive disease (7.1/100,000).[1] Of these cases, there were four deaths, for an annual mortality rate due to invasive GBS disease of 0.3/100,000 (Figure 1). This rate is less than that reported from 2001–2005 in the Portland area (0.5/100,000) and the 2006 national projections (0.58/100,000).[1] The 2006 case fatality rate for invasive GBS disease in the Portland area was 5%, lower than the Portland area from 2001–2005 and the entire ABCs network in 2006 (8% for both).[1] Of 79 cases where sex was known, 63% were male; of 48 cases where

race was known, 83% were white, 10% were black, and 6% were another race; and of 31 cases where ethnicity was known, 16% were Hispanic or Latino.

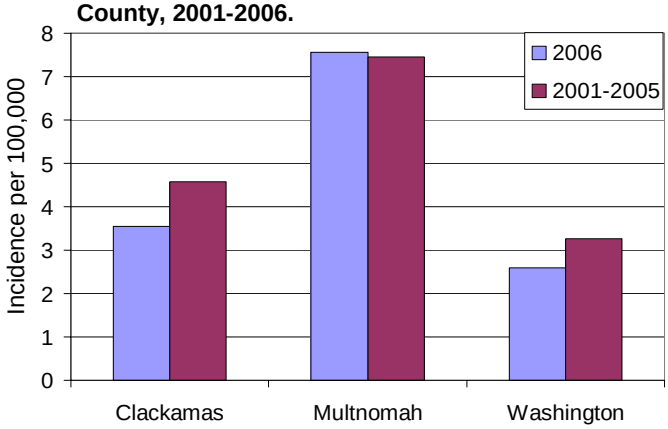
Figure 2: Incidence of Early- and Late-Onset Invasive GBS Disease, 2001-2006.



After a 78% decrease from 1996-2000, the incidence of early-onset GBS disease has stayed largely stable, outside of annual fluctuations. The incidence of late-onset disease has been stable throughout the surveillance period. In 2006, the incidence of early-onset disease was 0.32 per 1,000 live births, similar to the previous five-year average (0.31/1,000), but below the national estimate of disease (0.37/1,000).[1] The 2006 rate of late-onset disease, also 0.23 per 1,000 live births, was slightly lower than the previous five-year average (0.25/1,000), and 2006 national estimates (0.29/1,000).[1]

The incidence rate of invasive GBS disease in Multnomah County in 2006 (7.6/100,000) was higher than those reported from Clackamas (3.5/100,000) and Washington (2.6/100,000) Counties, similar to the historical pattern (Figure 3), although the rates in Clackamas and Washington counties were below the 2001-2005 averages. In 2006, the mortality rate due to GBS was highest in Washington County (0.4/100,000), followed by Clackamas (0.3/100,000), and Multnomah (0.1/100,000) counties. This is different than the usual pattern, in which mortality is typically highest in Multnomah and lowest in Washington Counties.

Figure 3: Incidence of Invasive GBS Disease by County, 2001-2006.



The burden of disease and death due to invasive GBS disease was highest in those ≥65 years of age (31 cases; incidence 19.9 /100,000 persons and 1 deaths; mortality 0.6 / 100,000) and a fatal outcome from IGBS is positively associated with age (p=0.016). Incidence was also high among those under five years of age (13 cases; incidence 12.1/100,000), although no deaths were reported among those in this age group. Except for those 35-49, among whom case incidence has been decreasing since 2001, GBS incidence and mortality has been largely stable.

Clinical Manifestations

The clinical manifestations of invasive GBS disease are listed in Table 1. With no cases reported, meningitis was less common in 2006 than during the previous five years (p=0.0005); all other syndromes were reported similarly. Those with cellulitis

Table 1: Percent of Invasive GBS cases reporting common clinical syndromes.†

Syndrome	2006	2001-2005
Primary Bacteremia	54	44
Pneumonia	11	14
Meningitis	0	3
Cellulitis	20	24
Other Syndrome‡	15	16

† Some cases report >1 syndrome; not all syndromes shown.
‡ Includes Abscess (not skin), peritonitis, HUS, pericarditis, septic arthritis, osteomyelitis, and endometritis.

were less likely to suffer a fatal outcome (p=0.02); other clinical syndromes were not associated with death.
For all cases reported since 2001, bacteremia was less common with increasing age (p=0.0002), while pneumonia and cellulitis were more common (p=0.0007 and p<0.0001, respectively). Bacteremia was the most common syndrome of early- and late-onset GBS disease in 2006, comprising 90% of these cases; pneumonia was reported in the remaining early-onset GBS case.

Underlying Conditions
Table 2 lists underlying conditions commonly reported or known risks for invasive GBS disease from 2001–2006. Overall, most (94%) cases reported at least one underlying condition or disease. Alcohol abuse, cirrhosis, and smoking were significantly associated with cases among younger adults, while cardiovascular disease and chronic obstructive pulmonary disease (COPD), were significantly associated with cases among older adults. Among cases occurring in children (less than 18 years of age), 72% reported no underlying condition and no one condition was commonly reported among the remainder.

Table 2: Percent of Adult Invasive GBS Cases with Reported Underlying Conditions, 2001-2006.

	18-64	65+	Total	p-value
Alcohol Abuse	**12**	**2**	**8**	**<0.0001**
Cancer	20	27	23	0.10
Cardiovascular Disease	**20**	**57**	**37**	**<0.0001**
COPD	**5**	**17**	**10**	**0.0002**
Cirrhosis	**16**	**4**	**11**	**<0.0001**
Diabetes	41	33	38	0.12
Dialysis	8	5	7	0.14
Immunosuppression	8	10	9	0.34
Smoking	**22**	**6**	**15**	**<0.0001**
None	5	7	6	0.39

While fatal outcome was associated with immunosuppression and cardiovascular disease in bivariate analysis, these associations were no longer significant after controlling for age. Among clinical syndromes, after controlling for age, diabetes was positively associated with cellulitis (adjusted odds ratio [aOR] 2.6; 95% Confidence Interval [CI] 1.7, 4.0).

Table 4: Serotype of Invasive GBS Isolates, 2001-2006.

Serotype	Early-Onset	Late-Onset	Other
IA	33	29	25
IB	12	0	11
III	27	57	9
V	15	11	30
Other‡	9	0	19
NT	3	4	7

‡Includes serotypes II, IV, VI, and VII

Serotype Analysis
The serotype profile of the 71 isolates submitted in 2006 was similar to that from 2001-2005. For all isolates submitted since 2001, serotype V was the most common cause (28%) of all cases, followed by serotype IA (26%) and serotype III (14%) (Table 4). However, serotype profile for early- and late-onset cases was different than that for other cases. The serotype of isolate was not associated with clinical manifestation or fatal outcome from invasive GBS disease.

Antibiotic susceptibility
Of 377 invasive GBS isolates tested for susceptibility to common antibiotics since 2001, 100% were susceptible to penicillin, ampicillin, cefuroxime, cefazolin, and vancomycin. Intermediate and full resistance to erythromycin were found among 3 (1%) and 97 (26%) isolates, respectively and intermediate and full resistance to clindamycin were found among 2 (1%) and 54 (14%) isolates, respectively. The percentages of isolates exhibiting resistance to both antibiotics have not changed since 2001. Serotype V was 2.9 times more likely to be resistant to erythromycin (95% CI 1.7, 5.0) than other or non-typable strains.

Early-Onset Invasive GBS Prevention Indicators
One of the seven infants (14%) with early-onset IGBS disease (EO) was born at <37 weeks gestation. All of the women with infants having EO IGBS had received prenatal care and were screened for GBS prior to admission. One was GBS culture-positive. No women had bacteria during pregnancy, a previous infant with IGBS, or a previous pregnancy with GBS colonization. Three of the women (43%) received intrapartum antibiotics: 1 for GBS prophylaxis after positive screening culture and 2 for suspected amnionitis. One woman received clindamycin for suspected amnionitis due to a record of antimicrobial allergy.

Discussion

A major focus of surveillance for invasive GBS disease has been the epidemiologic characterization of early-onset disease to assess the impact of screening and treatment guidelines for pregnant women. The guidelines, first released in 1996 and revised in 2002, led to national declines in early-onset GBS disease. That 100% of women of infants with early-onset disease had been screened for GBS colonization, and intrapartum antibiotics had been administered accordingly, should not be seen as a failure of the guidelines: although higher than the nadir reported in 2000, the 2006 early-onset GBS incidence rate was 65% lower than that seen in 1996. We would, undoubtedly, have seen much higher rates of disease without widespread prenatal screening Continued high adherence to these guidelines will help maintain the incidence of early-onset disease below the Healthy People 2010 target rate of 0.5/1,000 live births, which has been seen in Oregon throughout the surveillance period.[1]

The epidemiologic profile of invasive GBS disease in adults in Oregon is consistent with national data and previous studies.[3] In particular, invasive GBS in this population frequently occurs among those with increasing age or with one or more underlying condition. While diabetes is most frequent, other conditions include cancer, cirrhosis, cardiovascular disease, and smoking. Increasing resistance to erythromycin and clindamycin has also been reported nationally.[3] So far in Oregon, however, this increasing resistance does not seem to have translated into broad treatment failures leading to GBS mortality. Continued surveillance for invasive GBS disease among adults will be needed to identify the emergence of additional antibiotic resistance as well as better characterize disease occurrence among a population at an increasing risk of disease.

References:

1. Centers for Disease Control and Prevention. 2007. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Group B Streptococcus, 2006. Available at http://www.cdc.gov/ncidod/dbmd/abcs/survreports/gbs06.pdf.
2. Centers for Disease Control and Prevention. Early-Onset and Late-Onset Neonatal Group B Streptococcal Disease – United States, 1996-2004. *MMWR*. 2005; 54(47)1205-8.
3. Farley MM. Group B Streptococcal Disease in Nonpregnant Adults. *Clin Infect Dis*. 2001; 33:556-61.