

# Group B Streptococcus Surveillance Report 2011

Oregon Active Bacterial Core Surveillance (ABCs)

Center for Public Health Practice

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## Background

The Active Bacterial Core surveillance (ABCs) program is a core component of the Emerging Infections Program (EIP) Network sponsored by the Centers for Disease Control and Prevention (CDC). The purpose of the ABCs program 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), *Streptococcus pneumoniae*, and methicillin-resistant *Staphylococcus aureus* (MRSA). The entire EIP Network for invasive GBS represents almost 32 million persons in 10 surveillance areas around the United States. More information on the EIP/ABCs Network is found at: <http://www.cdc.gov/abcs/index.html>.

In Oregon, the surveillance area for invasive GBS (*Streptococcus agalactiae*) disease comprises the tri-county (Clackamas, Multnomah, and Washington) Portland metropolitan area, with a 2011 estimated population of 1,656,775.\* More information on the Oregon ABCs program is found at:

<http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/EmergingInfections/Pages/ActiveBacterialCoreSurveillance.aspx>.

## Methods

Invasive GBS disease (IGBS) 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, which forwards them 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 illnesses or conditions, and illness outcome.

## Surveillance Results

### Descriptive Epidemiology

In 2011, 103 cases of invasive GBS disease were reported in the tri-county Portland area, corresponding to an incidence rate of 6.2/100,000 persons (Figure 1). This is slightly lower than the average annual incidence rate in the Portland area from 2006–2010 (6.5/100,000) and 23 percent lower than the most recent national projection of invasive disease (8.0/100,000).<sup>1</sup> Of these cases, there were six deaths, for an annual mortality rate due to invasive GBS disease of 0.36/100,000 (Figure 1). This rate is equivalent to the figure reported from 2006–2010 in the Portland area (0.35/100,000) and 32 percent lower than the most recent national projections (0.53/100,000).<sup>1</sup>

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\* Source: Portland State University Population Research Center (<http://www.pdx.edu/prc/>)



The 2011 case fatality rate for invasive GBS disease in the Portland area was 6 percent, similar to the rates in the Portland area from 2006–2010 (5%) and the entire ABCs network in 2010 (7%).<sup>1</sup>

Of 103 cases where sex was known, 53 percent were male; of 88 cases where race was known, 91 percent were white, 5 percent were Asian/Pacific Islander, 3 percent were black, and 1 percent were American Indian/

Alaska Native; and of 52 cases where ethnicity was known, 10 percent were Hispanic or Latino.

The incidence rate of invasive GBS disease in Multnomah county in 2011 (7.8/100,000) was higher than those reported from Clackamas (6.1/100,000) and Washington (4.1/100,000) counties. The rates in Clackamas and Washington counties were slightly higher than their respective 2006-2010 averages, while the rate in Multnomah county was 12 percent lower than the previous five-year average. In 2011, the six deaths due to GBS occurred in Multnomah and Washington counties (0.54/100,000 and 0.37/100,000, respectively).

In 2011, the burden of disease due to invasive GBS disease was highest in those <1 year of age (7 cases; incidence 33.0/100,000) (Figure 2). Incidence was also high among those ≥65 years of age (43 cases; incidence 22.8/100,000) and among those between the ages of 50 and 64 (34 cases; incidence 10.7/100,000).

The burden of deaths due to invasive GBS disease was highest in those ≥65 years of age (5 deaths; mortality 2.7/100,000). One death was reported among the 50-64 year age group (mortality 0.31/100,000), while no deaths were reported among those under five. For cases reported since 2003, fatal outcome from IGBS has been associated with age (p=0.0172).

Figure 1: Incidence and Mortality Rates of IGBS Cases in Tri-county Area

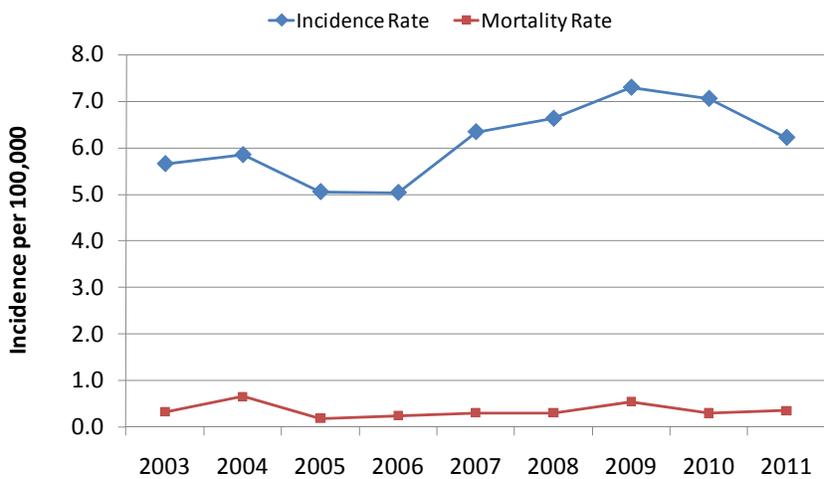
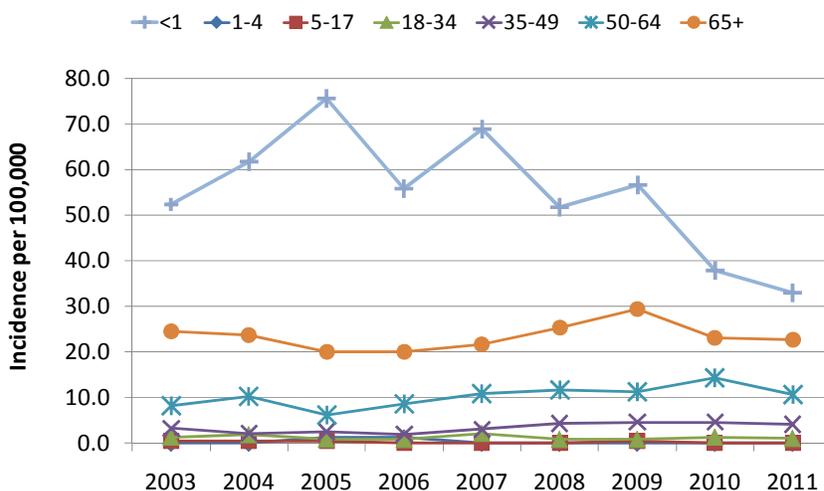


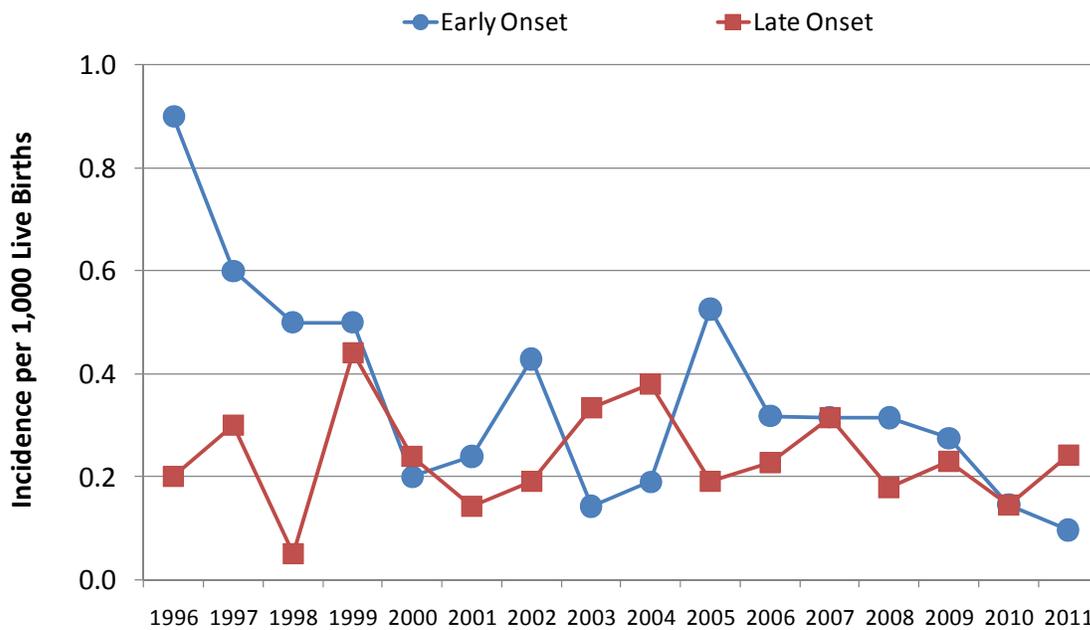
Figure 2: Incidence of IGBS Cases in Tri-county Area by Age



Among infants, there are two main types of GBS disease. Early-onset disease is defined as invasive GBS disease occurring in infants less than seven days of age; late-onset disease is defined as invasive GBS disease occurring in infants from 7 to 89 days of age.

After a 78 percent decrease from 1996-2000, the incidence of early-onset GBS disease has stayed largely stable, outside of annual fluctuations (Figure 3). The incidence of late-onset disease has been relatively stable throughout the surveillance period. In 2011, the incidence of early-onset disease – two cases; 0.10 per 1,000 live births – was 63 percent lower than the previous five-year average (0.27/1,000), and 60 percent lower than the national estimate of disease (0.25/1,000).<sup>1</sup> The 2011 rate of late-onset disease – five cases; 0.24 per 1,000 live births – was 9 percent higher than the previous five-year average (0.22/1,000) and 8 percent lower than the national estimate (0.26/1,000).<sup>1</sup>

**Figure 3: Incidence of Early- and Late-Onset IGBS Disease**



## Clinical Manifestations

The clinical manifestations of invasive GBS disease are listed in Table 1. The clinical manifestation profile of invasive GBS disease in 2011 was not statistically significantly different than that seen from cases reported during the previous five years.

**Table 1: Percent of IGBS Cases† Reporting Common Clinical Syndromes**

Syndrome	2011 (n=103)	2006-2010 (n=522)
Primary bacteremia	43	43
Cellulitis	25	27
Pneumonia	11	11
Meningitis	3	2
Other††	19	18

† Some cases report more than 1 syndrome.

†† Other syndrome includes abscess (not skin), endometritis, HUS (hemolytic uremic syndrome), osteomyelitis, pericarditis, peritonitis, septic arthritis.

For cases reported since 2006, pneumonia and cellulitis were more common with increasing age ( $p=0.0088$  and  $p<0.0001$ , respectively), while bacteremia and meningitis were less common ( $p<0.0001$  and  $p<0.0001$ , respectively). After adjusting for age, a fatal outcome was 2.2 times more likely among those presenting with bacteremia (95% confidence interval [CI] 1.1, 4.5) and almost five times less likely among those presenting with cellulitis (CI 1.4, 16.1). Nearly half (49%) of cellulitis cases reported a history of diabetes, and 35% have a history of cardiovascular disease. Among two infants with early-onset GBS disease reported in 2011, the clinical syndromes present were bacteremia and pneumonia. Among five late-onset cases, three presented with bacteremia and two with meningitis.

## Underlying Conditions

Almost 94 percent of adults with IGBS reported at least one underlying condition or behavioral risk factor for GBS disease. Alcohol abuse, cirrhosis, and smoking were significantly associated with cases among younger adults, while cancer, cardiovascular disease and chronic obstructive pulmonary disease (COPD) were significantly associated with cases among older adults (Table 2). Smoking, immunosuppression, and alcohol were significantly associated with fatal outcome among adults ( $p=0.0026$ ,  $p=0.0246$ , and  $p=0.0393$ , respectively) after adjusting for age.

**Table 2: Distribution of Underlying Conditions by Age Reported Among Adult IGBS Cases, 2006-2011**

Underlying Condition	18-64 (n=316)	65+ (n=242)	Total (n=558)	p-value
Alcohol Abuse	8	1	5	0.0005
Cancer	7	14	10	0.0056
Cardiovascular Disease	18	52	33	<0.0001
COPD	7	16	11	0.0006
Cirrhosis	12	2	8	<0.0001
Diabetes	43	47	45	0.39
Dialysis	6	3	5	0.18
Immunosuppression	14	9	12	0.06
Smoking	22	7	15	<0.0001
None	6	7	6	0.63

### Serotype Analysis

For all isolates tested (89%) since 2006, serotype IA was the most common cause of all cases (26%) followed by serotype V (22%). Table 3 displays the serotype distribution of isolates tested between 2006 and 2011.

**Table 3: Serotype Distribution of Isolates Tested by IGBS Disease Type, 2006-2011**

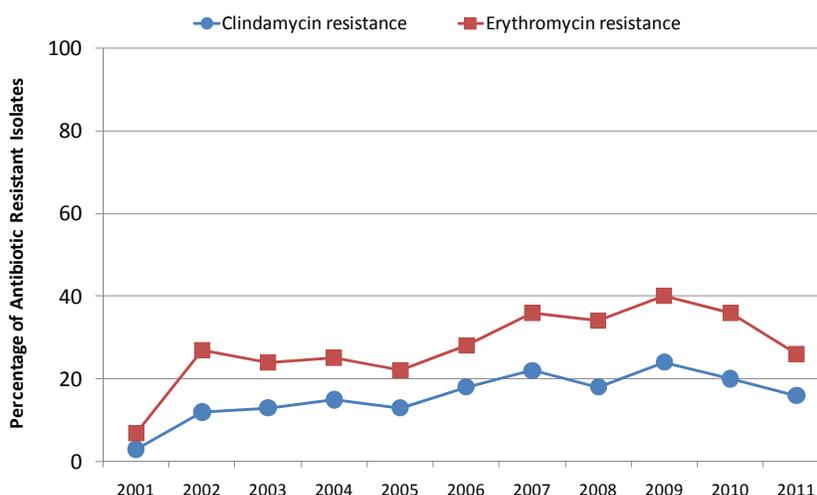
Serotype	Total (n=559) N (%)	Early-onset (n=28) N (%)	Late-onset (n=27) N (%)	All Other (n=504) N (%)
IA	144 (26)	7 (25)	10 (37)	127 (25)
IB	57 (10)	1 (4)	1 (4)	55 (11)
II	74 (13)	5 (18)	0 (0)	69 (14)
III	75 (13)	7 (25)	11 (41)	57 (11)
IV	29 (5)	0 (0)	1 (4)	28 (6)
V	125 (22)	5 (18)	2 (7)	118 (23)
VI	4 (1)	1 (4)	0 (0)	3 (1)
VII	1 (0)	0 (0)	0 (0)	1 (0)
Nontypeable	50 (9)	2 (7)	2 (7)	46 (9)

### Antibiotic Susceptibility

Of 545 invasive GBS isolates tested (87%) for susceptibility to common antibiotics since 2006, 100 percent were susceptible to ampicillin, cefotaxime, penicillin and vancomycin. Intermediate and full resistance to erythromycin were found among 7 (1%) and 210 (39%) isolates, respectively, and intermediate and full resistance to clindamycin were found among 8 (1%) and 122 (22%) isolates, respectively. Five isolates were found to be fully resistant to levofloxacin. Of the early-onset IGBS cases since 2006 (n=32), 31 percent were resistant to erythromycin and 19 percent were resistant to clindamycin.

Figure 4 displays clindamycin and erythromycin resistance among invasive GBS isolates since 2001. For cases reported since 2006, clindamycin and erythromycin resistance were not statistically significantly associated with age. Fatal outcome was also not associated with clindamycin and erythromycin resistance.

**Figure 4: Clindamycin and Erythromycin Resistance Among IGBS Isolates**



## Early-Onset Invasive GBS Prevention Indicators

In 2011, both of the two women with infants having EO IGBS had received prenatal care and were screened for GBS prior to admission. Neither woman had a positive culture. Neither of the women had bacteruria during pregnancy, a previous infant with IGBS, or a previous pregnancy with GBS colonization.

Guidelines for prophylaxis recommend penicillin or ampicillin, given that GBS is still fully susceptible to both. For women with documented penicillin allergies who are at low risk for anaphylaxis, cefazolin is recommended; if the risk of anaphylaxis is high, then either clindamycin or erythromycin is recommended unless the strain is known to be resistant. In the latter case, vancomycin is preferred.<sup>2</sup>

## 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 screening guidelines for prevention of IGBS, first released in 1996 and revised in 2002, have led to national declines in early-onset GBS disease.<sup>3</sup> While complete adherence to the guidelines would not prevent all cases of EO IGBS disease, occurrence would undoubtedly be higher without prenatal screening and appropriate administration of intrapartum antibiotics.

The epidemiologic profile of invasive GBS disease in adults in Oregon is consistent with national data and previous studies.<sup>4</sup> Invasive GBS in nonpregnant adults is increasing, particularly in elderly persons and those with significant underlying diseases.<sup>4</sup> In Oregon, alcohol abuse, cirrhosis, and smoking were significantly associated with cases among younger adults, while cancer, cardiovascular disease and COPD were significantly associated with cases among older adults.

Increasing resistance to erythromycin and clindamycin has also been reported nationally.<sup>4</sup> So far in Oregon, however, this increasing resistance does not seem to have translated into broad treatment failures leading to GBS mortality. Continued surveillance of invasive GBS disease among adults will be needed to monitor trends in antibiotic resistance, describe the characteristics of increases in invasive GBS occurrence, and better characterize the disease among this population.

## References

1. Centers for Disease Control and Prevention. 2012. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Group B *Streptococcus*, 2010. Available at <http://www.cdc.gov/abcs/reports-findings/survreports/gbs10.pdf>. Accessed 16 Aug 2012.
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4. Farley MM. Group B Streptococcal Disease in Nonpregnant Adults. *Clin Infect Dis*. 2001; 33:556-61.