

# Haemophilus influenzae 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 CDC Emerging Infections Program Network. 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), and methicillin-resistant *Staphylococcus aureus* (MRSA). The entire EIP Network for invasive *H. influenzae* disease represents 39.0 million persons in 10 surveillance areas. More information on the EIP/ABCs Network is found at: <http://www.cdc.gov/ncidod/dbmd/abc>.

In Oregon, the surveillance area for invasive *H. influenzae* disease comprises the entire state of Oregon with a 2006 estimated population of 3,690,505. More information on the Oregon ABCs program is found at: <http://oregon.gov/DHS/ph/acd/abc.shtml>.

## Methodology:

Invasive *H. influenzae* disease (IHiD) is defined as the isolation of *H. influenzae* from a normally sterile body site in resident of Oregon. Since IHiD is reportable in Oregon, hospital laboratories submit sterile-site *H. influenzae* microbiology isolates to the Oregon State Public Health Laboratory for serotyping. Additional cases are identified through regular laboratory record reviews. Isolates are then sent to a CDC laboratory for confirmation of serotype. Health record reviews of each case provide standardized reports of demographic characteristics, clinical syndrome manifestations, underlying illnesses or conditions, and illness outcome.

## Surveillance Results:

### Burden of Disease

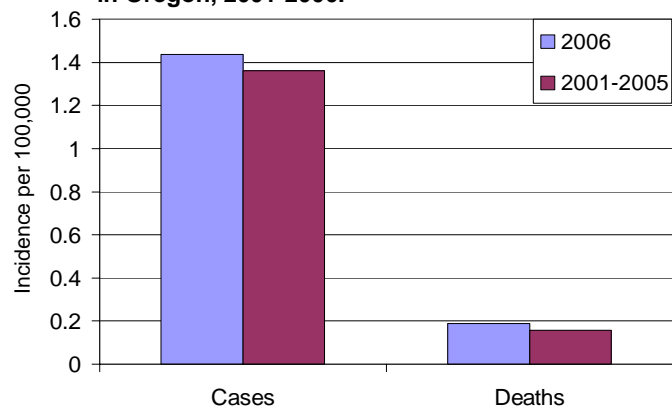
In 2006, 53 cases of IHiD were reported in Oregon, corresponding to an incidence rate of 1.4/100,000 persons (Figure 1).

This is similar to the average annual incidence rate in Oregon from 2001-2005 and lower than the 2006 national projections of disease (1.6/100,000).<sup>1</sup>

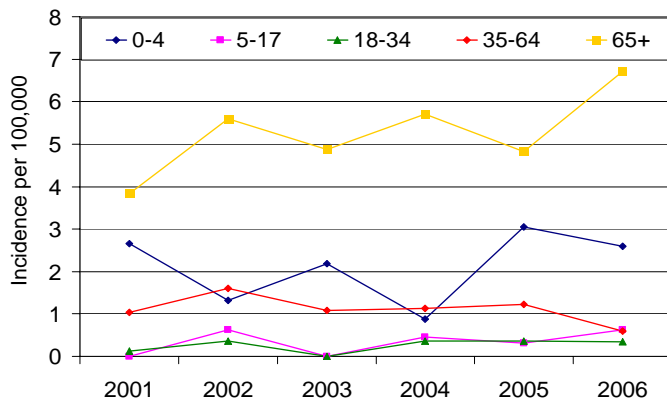
There were seven IHiD deaths in 2006, for an annual mortality rate of 0.2/100,000 (Figure 1), similar to the national mortality rate projection for IHiD and the average annual 2001-2005 rate in Oregon.<sup>1</sup> The 2006 case fatality rate for IHiD in Oregon was 13%;

higher than the 11% reported for Oregon from 2001-2005, yet slightly lower than the 15%, based on national projections.<sup>1</sup> Of 53 cases where sex was known, 60% were female; of 44 cases where race was known, 95% were white and 5% were another race; and of 42 cases where ethnicity was known, 5% were Hispanic or Latino.

Figure 1: Incidence of IHiD Cases and Deaths in Oregon, 2001-2006.



**Figure 2: Incidence of IHiD Cases in Oregon by Age, 2001-2006.**



The burden of IHiD in 2006 was highest (6.7/100,000) among those 65 years of age and older, followed by those from 0-4 years of age (2.6/100,000), consistent with historical patterns. (Figure 2) Since 2001, IHiD incidences among those 65 years and older and those 0-4 have shown a general increasing trend, with that in the former group more dramatic. The incidences among other age groups have been largely stable, outside of year-to-year fluctuation. Mortality due to IHiD was also highest among those 65 years of age and older (0.9/100,000), followed by those from 0-4 years of age

(0.4/100,000). Because of this pattern, age was not significantly related to IHiD mortality.

### Clinical Manifestations

The top two clinical manifestations of IHiD reported in 2006 –bacteremic pneumonia (clinical pneumonia with a positive blood culture) and primary bacteremia – were reported among 47% and 28% of cases, respectively (Table 1). This is similar to historical patterns as the clinical syndrome profile has been roughly stable over the six year period. From 2001-2006, clinical manifestation of IHiD was not significantly associated with fatal outcome.

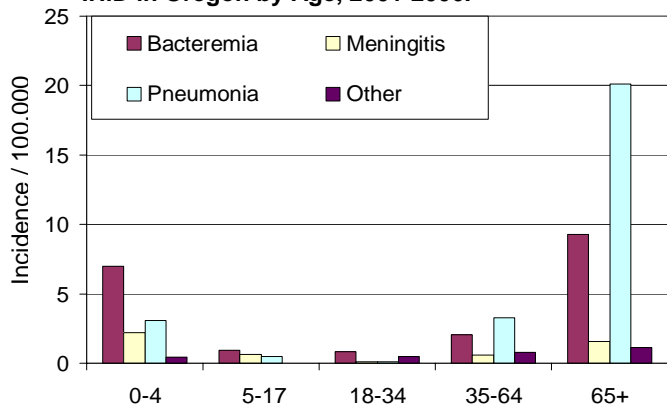
**Table 1: Percent of IHiD cases reporting common clinical syndromes<sup>†</sup>.**

Syndrome	2006	2001-2005
Bacteremic Pneumonia	47	50
Primary Bacteremia	28	35
Meningitis	13	8
Other <sup>††</sup>	11	9

<sup>†</sup> Some cases report >1 syndrome.

<sup>††</sup>Other syndrome includes: cellulitis, epiglottitis, sterile abscess, peritonitis, septic arthritis, endometritis, and septic abortion.

**Figure 3: Clinical Manifestation of IHiD in Oregon by Age, 2001-2006.**



From 2001-2006, bacteremia was the most common presentation among all persons less than 35 years of age, after which bacteremic pneumonia was more common. Meningitis was more common among younger individuals, the highest incidence and percentage of cases seen in those 0-4 and 5-17 years of age, respectively.. Bacteremic pneumonia increased with age ( $p < 0.0001$ ) to a maximum in those 65 years of age and older.

### Underlying Conditions

The most common underlying conditions reported among IHiD cases in 2006 were cardiovascular disease (32%), chronic obstructive pulmonary disease (COPD) (26%), cancer (17%), smoking (17%), diabetes (15%) and asthma (11%). No underlying conditions were reported among any cases occurring in individuals less than 35 years of age. This profile is similar to the underlying condition profile seen for all cases reported since 2001 (Table 2). Cardiovascular disease, COPD, and cancer increase with increasing age, while the remaining underlying conditions are reported most frequently from those 35-64 years of age.

Cardiovascular disease is the only condition associated with a fatal outcome from IHiD ( $p=0.048$ ).

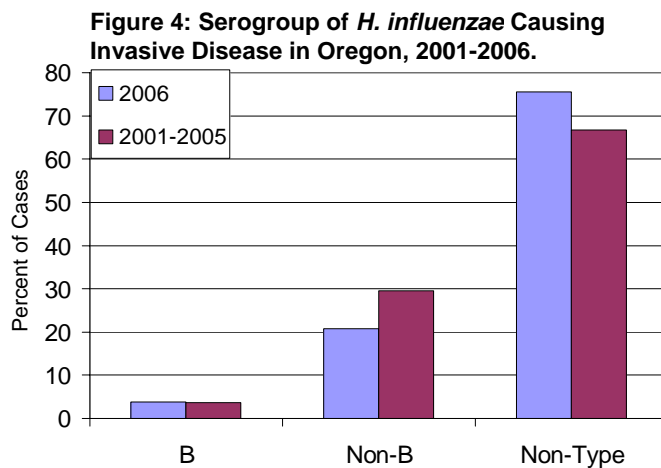
While bivariate analyses revealed several significant associations between underlying conditions and clinical syndrome manifestation, no conditions were significant predictors of any clinical manifestation, after controlling for age.

#### Serotype Analysis

In 2006, serotyping was completed for all *H. influenzae* isolates causing invasive disease. Of these, 40 (75%) were non-typeable and 11 (21%) were of a type other than type b (Figure 4). This was similar to the serotype profile seen since 2001. Two cases of type b (4%) were reported in 2006. One case presented as meningitis in a fully immunized 6-year-old male and the other presented as pneumonia in an 84-year old male. No cases of IHiD type b have been reported in those less than five years of age since 2004.

**Table 2: IHiD Cases with Reported Underlying Conditions, 2001-2006.**

	N (%)
Cardiovascular Disease	78 (27)
COPD	59 (20)
Cancer	48 (16)
Diabetes	46 (16)
Smoking	41 (14)
Asthma	34 (12)
Immunosuppression	27 (9)
Alcohol Abuse	16 (5)



#### Discussion:

Prior to vaccine licensure, *H. influenzae* serotype b (Hib) was the leading cause of bacterial meningitis and retardation among infants. However, the development of a type b polysaccharide-protein conjugate vaccine and recommendations for vaccination of infants as young as 2 months of age has virtually eliminated Hib disease.<sup>2</sup> With zero cases of Hib reported among those less than five in the past two years, Oregon has reached the Healthy People 2010 goal of decreasing Hib disease to zero cases per 100,000 persons in this age group.<sup>1</sup>

The primary focus of IHiD surveillance will continue to be the identification and characterization of Hib disease in those less than five years of age to identify Hib vaccination failures. However, further analysis will also be needed to better characterize the increasing trend in IHiD among the elderly.

#### References:

- Centers for Disease Control and Prevention. 2007. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, *Haemophilus influenzae*, 2006. Available via the Internet: <http://www.cdc.gov/ncidod/dbmd/abcs/surveysreports/hib06.pdf>.
- Centers for Disease Control and Prevention. Achievements in Public Health, 1990-1999 Impact of Vaccines Universally Recommended for Children – United States, 1990-1999. MMWR 1999; 48(12):243-8.