



## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	35
Annual Incidence <sup>a</sup>	
LA County	0.37
California <sup>b</sup>	0.10
United States <sup>c</sup>	1.21
Age at Diagnosis	
Mean	41.1 years
Median	36.0 years
Range	Birth – 91 years

<sup>a</sup>Cases per 100,000 population.

<sup>b</sup>The incidence rates for California only include cases age <15 years

<sup>c</sup>Calculated from Final 2013 Reports of Nationally Notifiable Infectious Disease. MMWR 63(32); 702-716.

### DESCRIPTION

*Haemophilus influenzae* (*H. influenzae*) is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. Invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Transmission is via respiratory secretions of infected individuals. There are six encapsulated, typeable strains (a–f), as well as unencapsulated, nontypeable strains. *H. influenzae* serotype B (Hib) is the only serotype that is vaccine-preventable and for which chemoprophylaxis is recommended. Thus, determining the serotype on laboratory specimens for all suspect cases is critical. Since June 2007, in accordance with the revised California Department of Public Health guidelines, the only cases of invasive *H. influenzae* investigated in Los Angeles County (LAC) are those in persons less than 15 years of age. The data are not representative of all *H. influenzae* cases in LAC since only cases <15 years of age are mandated to be reported.

#### Immunization Recommendations:

- Prior to the introduction of the Hib conjugate vaccine in 1990, most cases of invasive disease in children were caused by serotype B.
- Currently, all infants, including those born prematurely, are recommended to receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of primary doses (2 or 3) depends on the brand of vaccine used.
- A booster dose is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- California State law requires that all children, up to age 4 years and 6 months, receive 1 dose of Hib vaccine on or after their first birthday, if they attend child care.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### 2013 TRENDS AND HIGHLIGHTS

- For the fourth year in a row, no serotype B cases were identified; thus, none of the *H. influenzae* cases were vaccine-preventable (Figures 6, 7, 8).
- Since 2010, the annual incidence rate has continued to decline, with 2013 being the lowest reported rate in the last ten years. In comparison, the annual incidence rate in California has remained relatively the same, while the US has seen an overall increase in the annual incidence, during the last ten years (Figure 1).
- The highest incidence rates of *H. influenzae* were in the <1 and ≥65 age groups, a trend that has continued to occur since 2009 (Figure 2).
- None of the cases were linked. SPA 1 and SPA 4 reported the highest incidence rate although the case numbers are small; SPA 5 was the only SPA without any reported cases (Figure 4).



- The highest incidence rates for 2013 occurred in the first half of the year, with a peak in February. This is in contrast to the previous five years, when incidence rates would usually start to increase in February and peak in April (Figure 5).
- Reported cases were either non-B (n=19) or unknown serotypes (n=16) (Figures 6, 7, 8). All of the 16 cases with unknown serotype were  $\geq 15$  years of age so serotype testing was not requested. Among all 35 cases, 66% (n=23) were  $\geq 15$  years of age and were also not investigated further. Thus, data on race/ethnicity and locations are missing for many of the cases (Figure 3).



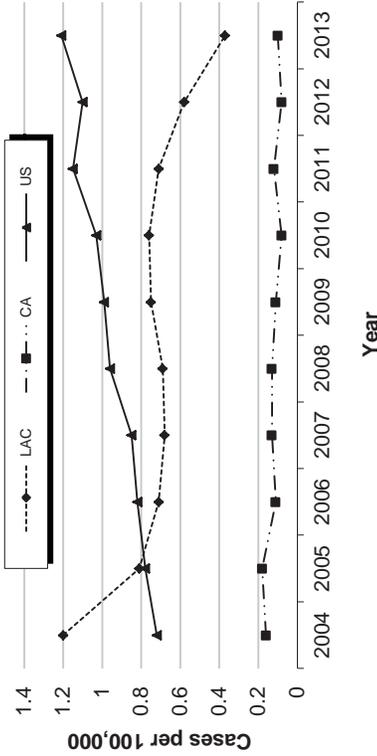
**Reported *H. Influenzae* Cases and Rates\* per 100,000 by Age Group, Race/Ethnicity, and SPA  
Los Angeles County, 2009-2013\*\***

Age Group	2009 (N=69)			2010 (N=70)			2011 (N=66)			2012 (N=54)			2013 (N=35)		
	No.	(%)	Rate/ 100,000												
<1	7	10.1	5.7	9	12.8	7.5	3	4.5	2.5	4	7.4	3.4	7	20.0	5.8
1-4	4	5.8	0.8	3	4.3	0.6	4	6.1	0.8	3	5.6	0.6	4	11.4	0.8
5-14	0	0.0	-	4	5.7	0.3	7	10.6	0.6	0	0.0	0.0	1	2.9	0.1
15-34	7	10.1	0.2	3	4.3	0.1	6	9.1	0.2	4	7.4	0.1	5	14.3	0.2
35-44	2	2.9	0.1	6	8.6	0.4	6	9.1	0.5	7	13.0	0.5	1	2.9	0.1
45-54	8	11.6	0.6	9	12.9	0.7	4	6.1	0.3	4	7.4	0.3	1	2.9	0.1
55-64	11	15.9	1.2	8	11.4	0.8	7	10.6	0.7	5	9.3	0.5	3	8.6	0.3
65+	30	43.5	3.0	28	40.0	2.8	29	43.9	2.8	27	50.0	2.4	13	37.1	1.2
Unknown	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-
<b>Race/Ethnicity</b>															
Asian	3	4.4	0.2	0	0.0	-	3	4.6	0.2	4	7.4	0.3	1	2.9	0.1
Black	6	8.7	0.8	2	2.9	0.3	3	4.6	0.4	3	5.6	0.4	3	8.6	0.4
Hispanic	8	11.6	0.2	15	21.4	0.3	12	18.2	0.3	8	14.8	0.2	5	14.3	0.1
White	10	14.5	0.4	20	28.6	0.8	9	13.6	0.3	10	18.5	0.4	9	25.7	0.3
Other	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	0.0	0	0.0	-
Unknown	42	60.9	-	33	47.1	-	39	59.1	-	29	53.7	-	17	48.6	-
<b>SPA</b>															
1	1	1.5	0.5	0	0.0	-	0	0.0	-	2	3.7	0.5	3	8.6	0.8
2	17	24.6	0.8	28	40.0	1.3	20	30.3	0.9	10	18.5	0.5	8	22.9	0.4
3	7	10.1	0.4	5	7.1	0.3	6	9.1	0.4	6	11.1	0.4	5	14.3	0.3
4	5	7.3	0.4	8	11.4	0.7	5	7.6	0.4	8	14.8	0.7	6	17.1	0.5
5	2	2.9	0.3	2	2.9	0.3	5	7.6	0.8	4	7.4	0.6	0	0.0	-
6	9	13.0	0.9	4	5.7	0.4	4	6.1	0.3	9	16.7	0.9	3	8.6	0.3
7	11	15.9	0.8	6	8.6	0.5	8	12.1	0.5	3	5.6	0.2	5	14.3	0.4
8	6	8.7	0.6	7	10.0	0.7	9	13.6	0.7	8	14.8	0.8	3	8.6	0.3
Unknown	11	15.9	-	10	14.3	-	9	13.6	-	4	7.4	-	2	5.7	-

\*Rates calculated based on less than 19 cases or events are considered unreliable. A zero rate is reported with a dash ("-").  
\*\*The data are not representative of all *H. influenzae* cases in Los Angeles County since only cases <15 years of age are mandated to be reported.

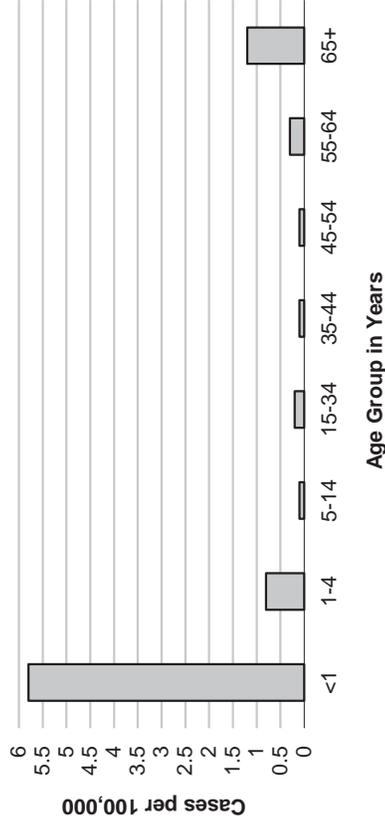


**Figure 1. Incidence Rates of *H. influenzae* Invasive Disease, US, CA and LAC, 2004-2013\***

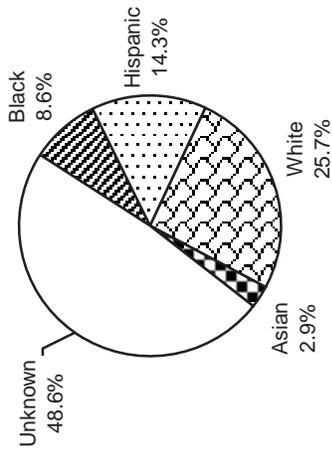


\*The incidence rates for CA only includes cases aged <30 years (2004-2006) and cases aged <15 years (2007-2013). The incidence rates for the US include cases of all ages. The data are not representative of all *H. influenzae* cases in Los Angeles County since only cases <15 years of age are mandated to be reported.

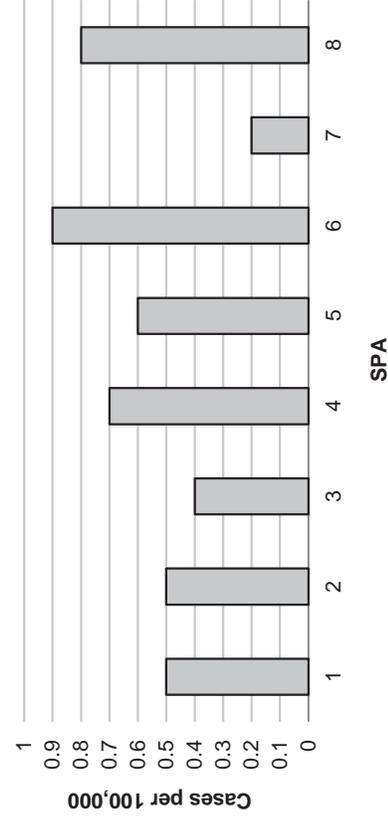
**Figure 2. Incidence Rates of *H. influenzae* Invasive Disease by Age Group LAC, 2013\* (N=35)**



**Figure 3. Percent Cases of *H. influenzae* Invasive Disease by Race/Ethnicity, LAC, 2013 (N=35)**



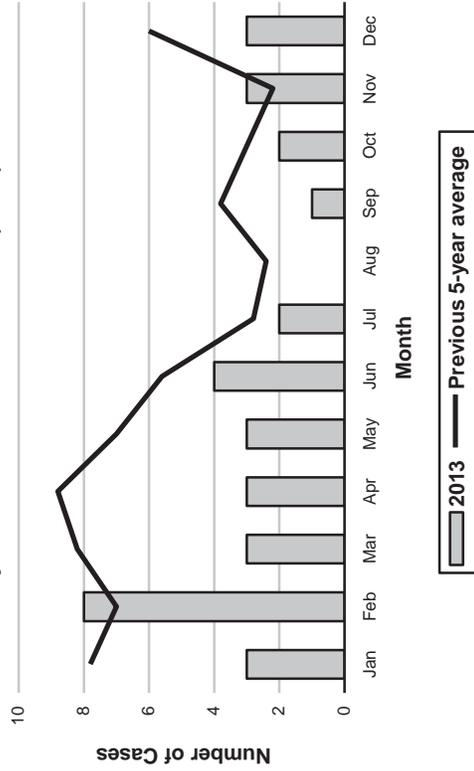
**Figure 4. Incidence Rates of *H. influenzae* Invasive Disease by SPA, LAC, 2013\* (N=35)**



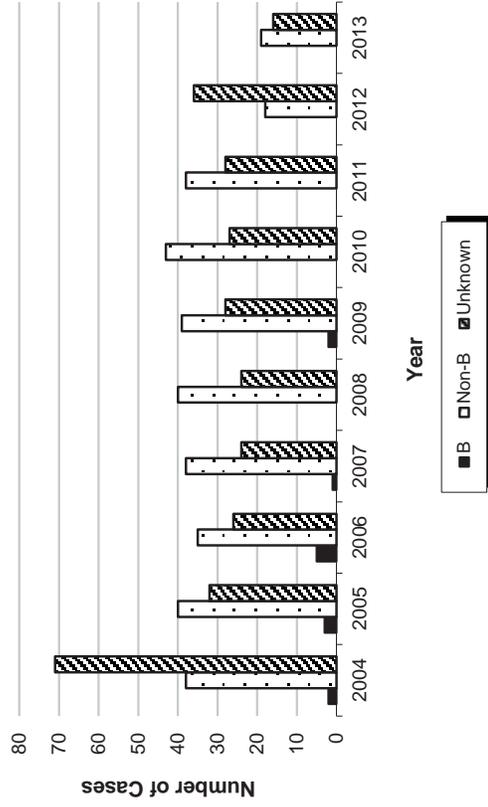
\* The data are not representative of all *H. influenzae* cases in Los Angeles County since only cases <15 years of age are mandated to be reported.



**Figure 5. Reported *H. influenzae* Invasive Disease Cases by Month of Onset, LAC, 2013\* (N=35)**



**Figure 6. Reported *H. influenzae* Invasive Disease Cases by Serotype, LAC, 2004-2013\***

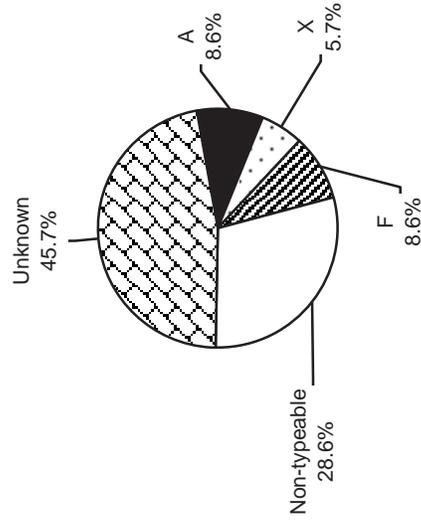


**Figure 7. Reported *H. influenzae* Invasive Disease Cases by Serotype, 2013\* (N=35) vs. Previous 5-Year Average\***

	B		Non-B		Unknown <sup>1</sup>	
	2013	Previous 5-Year Average	2013	Previous 5-Year Average	2013	Previous 5-Year Average
Total Cases	0	0.4	19	35.6	16	28.6
Age at Onset (years)	--	52.5	41.1	45.2	58.9	62.0
Mean	--	52.5	36.0	52.8	65.0	65.3
Median	--	48 - 57	<1 - 91	<1 - 99	17 - 91	<1 - 99
Range	--	0.0%	0.0%	2.8%	0.0%	4.9%
Case Fatality	--	0.0%	0.0%	2.8%	0.0%	4.9%

<sup>1</sup>All of the unknown serotype cases are >15 years of age so no further serotype testing is requested.

**Figure 8. Percent Cases of *H. influenzae* Invasive Disease by Serotype LAC, 2013\* (N=35)**



\* The data are not representative of all *H. influenzae* cases in Los Angeles County since only cases < 15 years of age are mandated to be reported.





## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	54
Annual Incidence <sup>a</sup>	
LA County	0.6
California <sup>b</sup>	0.08
United States <sup>c</sup>	1.10
Age at Diagnosis	
Mean	56.9 years
Median	64.5 years
Range	Birth – 99 years

<sup>a</sup>Cases per 100,000 population.

<sup>b</sup>The incidence rates for California only include cases age <15 years

<sup>c</sup>Calculated from Final 2012 Reports of Nationally Notifiable Infectious Disease. MMWR 62(33):669-682.

### DESCRIPTION

*Haemophilus influenzae* (*H. influenzae*) is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. Invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Transmission is via respiratory secretions of infected individuals. There are six encapsulated, typeable strains (a–f), as well as unencapsulated, nontypeable strains. *H. influenzae* serotype B (Hib) is the only serotype that is vaccine-preventable and for which chemoprophylaxis is recommended. Thus, determining the serotype on laboratory specimens for all suspect cases is critical. Since June 2007, in accordance with the revised California Department of Public Health guidelines, the only cases of invasive *H. influenzae* investigated in Los Angeles County (LAC) are those in persons less than 15 years of age.

#### Immunization Recommendations:

- Prior to the introduction of the Hib conjugate vaccine in 1990, most cases of invasive disease in children were caused by serotype B.
- Currently, all infants, including those born prematurely, are recommended to receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of primary doses (2 or 3) depends on the brand of vaccine used.
- A booster dose is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- California State law requires that all children, up to age 4 years and 6 months, receive 1 dose of Hib vaccine on or after their first birthday, if they attend child care.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### 2012 TRENDS AND HIGHLIGHTS

- For the third year in a row, no serotype B cases were identified; thus, none of the *H. influenzae* cases were vaccine-preventable (Figures 6, 7, 8).
- The highest incidence rates of *H. influenzae* continued to occur in the <1 and 65+ age groups (Figure 2). No cases between the ages of 5-14 years were reported (Figure 2).
- None of the cases were linked. SPA 6 and SPA 8 reported the highest incidence rates (Figure 4).
- The highest incidence rates for 2012 occurred in the first half of the year, with a peak in February. This is in contrast to the previous five years, when incidence rates would usually start to increase in February and peak in April (Figure 5).
- Reported cases were either non-B (n=18) or unknown serotypes (n=36) (Figures 6, 7, 8). All of the 36 cases with unknown serotype were ≥15 years of age so serotype testing was not requested. Among all 54 cases, 87% (n=47) were ≥15 years of age and were also not investigated further. Thus, data on race/ethnicity and locations are missing for many of the cases (Figure 3).



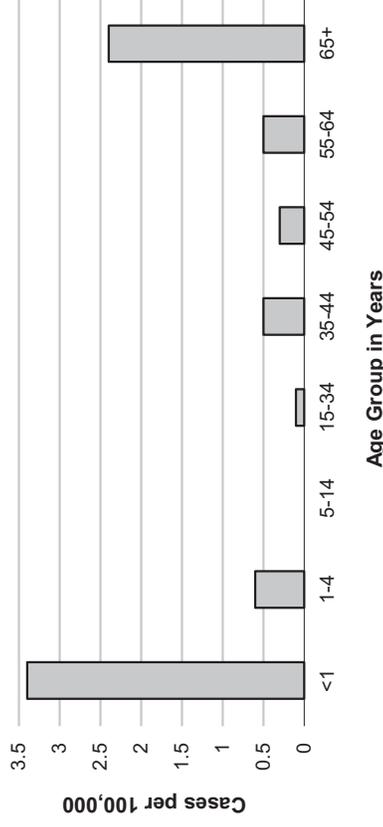
**Reported H. Influenzae Cases and Rates\* per 100,000 by Age Group, Race/Ethnicity, and SPA  
Los Angeles County, 2008-2012**

Age Group	2008 (N=64)			2009 (N=69)			2010 (N=70)			2011 (N=66)			2012 (N=54)		
	No.	(%)	Rate/ 100,000												
<1	6	9.4	4.3	7	10.1	5.1	9	12.8	6.4	3	4.5	2.5	4	7.4	3.4
1-4	2	3.1	0.4	4	5.8	0.7	3	4.3	0.5	4	6.1	0.8	3	5.6	0.6
5-14	3	4.7	0.2	0	0.0	-	4	5.7	0.3	7	10.6	0.6	0	0.0	0.0
15-34	4	6.3	0.1	7	10.1	0.2	3	4.3	0.1	6	9.1	0.2	4	7.4	0.1
35-44	5	7.8	0.3	2	2.9	0.1	6	8.6	0.4	6	9.1	0.5	7	13.0	0.5
45-54	11	17.2	0.8	8	11.6	0.6	9	12.9	0.7	4	6.1	0.3	4	7.4	0.3
55-64	2	3.1	0.2	11	15.9	1.2	8	11.4	0.8	7	10.6	0.7	5	9.3	0.5
65+	31	48.4	3.0	30	43.5	2.8	28	40.0	2.6	29	43.9	2.8	27	50.0	2.4
Unknown	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-
<b>Race/Ethnicity</b>															
Asian	3	4.7	0.2	3	4.4	0.2	0	0.0	-	3	4.5	0.2	4	7.4	0.3
Black	2	3.1	0.2	6	8.7	0.7	2	2.9	0.2	3	4.5	0.4	3	5.6	0.4
Hispanic	13	20.3	0.3	8	11.6	0.2	15	21.4	0.3	12	18.2	0.3	8	14.8	0.2
White	9	14.1	0.3	10	14.5	0.3	20	28.6	0.7	9	13.6	0.3	10	18.5	0.4
Other	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	-	0	0.0	0.0
Unknown	37	57.8	-	42	60.8	-	33	47.1	-	39	59.1	-	29	53.7	-
<b>SPA</b>															
1	0	0.0	-	2	2.9	0.5	4	5.7	1.1	0	0.0	-	2	3.7	0.5
2	7	10.9	0.3	16	23.2	0.7	26	37.1	1.2	20	30.3	0.9	10	18.5	0.5
3	10	15.6	0.6	7	10.1	0.4	4	5.7	0.2	6	9.1	0.4	6	11.1	0.4
4	8	12.5	0.6	5	7.3	0.4	7	10.0	0.6	4	6.1	0.4	8	14.8	0.7
5	4	6.3	0.6	2	2.9	0.3	2	2.9	0.3	5	7.6	0.8	4	7.4	0.6
6	10	15.6	0.9	8	11.6	0.8	4	5.7	0.4	3	4.5	0.3	9	16.7	0.9
7	10	15.6	0.7	11	15.9	0.8	6	8.6	0.4	7	10.6	0.5	3	5.6	0.2
8	9	14.1	0.8	7	10.2	0.6	7	10.0	0.6	7	10.6	0.7	8	14.8	0.8
Unknown	6	9.4	-	11	15.9	-	10	14.3	-	14	21.2	-	4	7.4	-

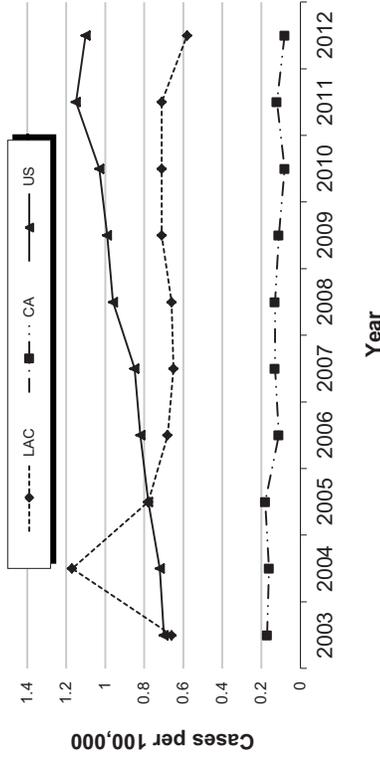
\*Rates calculated based on less than 19 cases or events are considered unreliable. A zero rate is reported with a dash ("-").



**Figure 2. Incidence Rates of *H. influenzae* Invasive Disease by Age Group LAC, 2012 (N=54)**

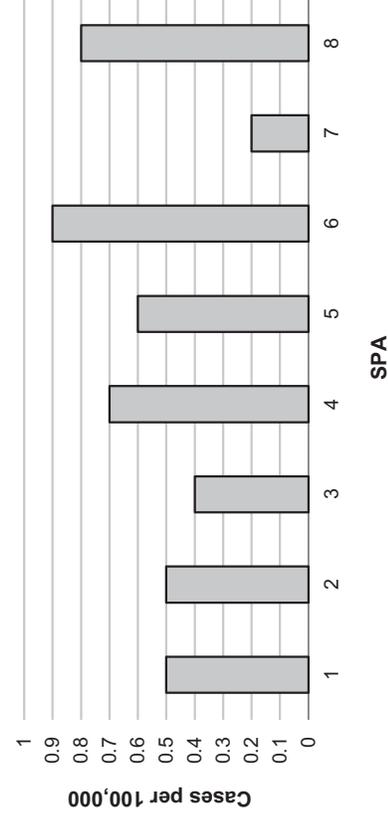


**Figure 1. Incidence Rates of *H. influenzae* Invasive Disease US, CA and LAC, 2003-2012\***

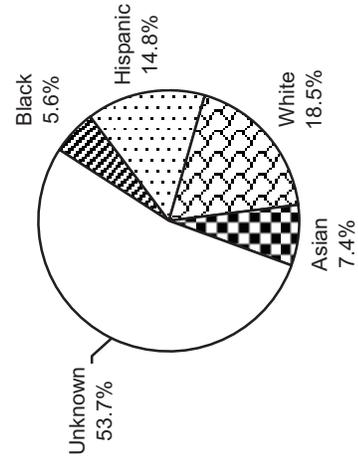


\*The incidence rates for CA only includes cases aged <30 years (2001-2006) and cases aged <15 years (2007-2010).

**Figure 4. Incidence Rates of *H. influenzae* Invasive Disease by SPA, LAC, 2012 (N=54)**

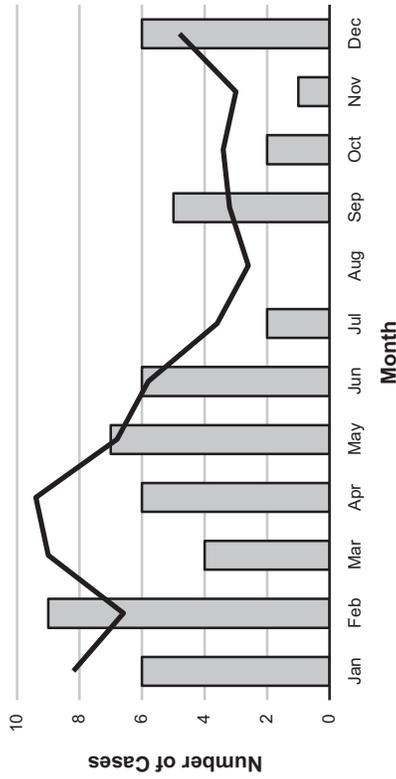


**Figure 3. Percent Cases of *H. influenzae* Invasive Disease by Race/Ethnicity, LAC, 2012 (N=54)**

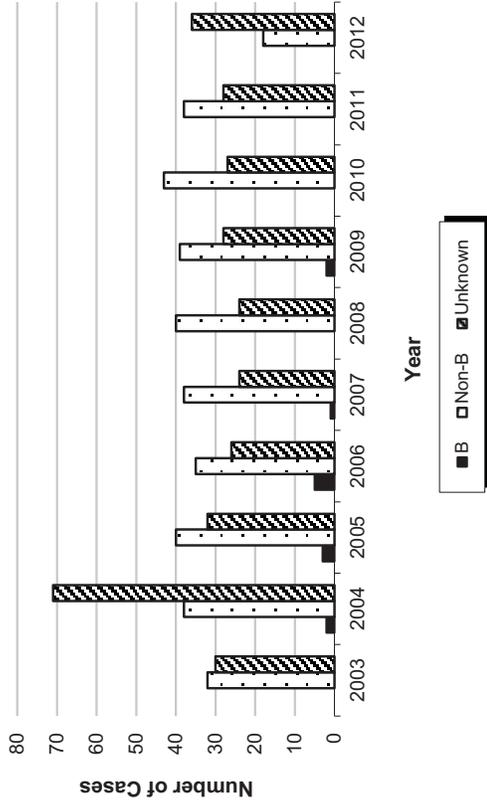




**Figure 5. Reported *H. influenzae* Invasive Disease Cases by Month of Onset, LAC, 2012 (N=54)**



**Figure 6. Reported *H. influenzae* Invasive Disease Cases by Serotype, LAC, 2003-2012**



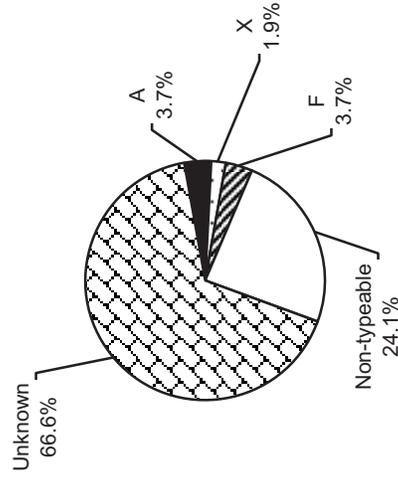
**Figure 7. Reported *H. influenzae* Invasive Disease Cases by Serotype, 2012 (N=54) vs. Previous 5-Year Average**

	B		Non-B		Unknown <sup>2</sup>	
	2012	Previous 5-Year Average	2012	Previous 5-Year Average	2012	Previous 5-Year Average
Total Cases	0	0.6	18	39.6	36	26.2
Age at Onset (years)	--	61.8	41.4	44.9	64.7	62.4
Mean	--	61.8	49.0	51.3	67.5	65.4
Median	--	48 - 71	<1 - 90	<1 - 99	27 - 99	<1 - 98
Range	--	0.0%	11.1% <sup>1</sup>	1.5%	5.6%	7.6%
Case Fatality	--	0.0%	11.1% <sup>1</sup>	1.5%	5.6%	7.6%

<sup>1</sup>Two deaths were reported. The first case was born prematurely and was hospitalized for sepsis. The second case was >15 years of age and was hospitalized for pneumonia and sepsis.

<sup>2</sup>All of the unknown serotype cases are >15 years of age so no further serotype testing is requested.

**Figure 8. Percent Cases of *H. influenzae* Invasive Disease by Serotype LAC, 2012 (N=54)**





## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	70
Annual Incidence <sup>a</sup>	
LA County	0.71
California <sup>b</sup>	0.09
United States <sup>c</sup>	--
Age at Diagnosis	
Mean	48.4 years
Median	54.0 years
Range	Birth – 91 years

<sup>a</sup>Cases per 100,000 population.

<sup>b</sup>The incidence rates for California only include cases age <15 years

<sup>c</sup>See Final Summary of Nationally Notifiable Infectious Diseases, United States on MMWR website

[http://www.cdc.gov/mmwr/mmwr\\_nd/index.html](http://www.cdc.gov/mmwr/mmwr_nd/index.html)

### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. Invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Transmission is via respiratory secretions of infected individuals. There are six encapsulated, typeable strains (a–f), as well as unencapsulated, nontypeable strains. *H. influenzae* serotype B (Hib) is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective. Thus, determining the serotype on laboratory specimens for all suspect cases is critical. *H. influenzae* invasive disease primarily affects infants and elderly persons, as well as immunocompromised individuals. Since June 2007, the only cases of invasive *H. influenzae* investigated in LAC are those in persons less than 15 years of age.

#### Immunization Recommendations:

- Prior to the introduction of the Hib conjugate vaccine in 1990, most cases of invasive disease in children were caused by serotype B.
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses (2 or 3) depends on the brand of vaccine used.
- A booster dose is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series. In 2008, a vaccine shortage resulted in CDC interim guidelines calling for a temporary deferral of the booster dose except to children in special high risk groups. However, as of July 2009, increasing vaccine supply led to the CDC's recommendation that the booster dose be reinstated.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### 2010 TRENDS AND HIGHLIGHTS

- No serotype B cases were identified so none of the cases were vaccine-preventable (Figures 6, 7, 8).
- As in previous years, the highest incidence rates occurred in the <1 and 65+ age groups (Figure 2).
- None of the cases were linked. Unlike previous years, SPA 1 and SPA reported the highest incidence rates (Figure 4).
- Similar to previous years, the highest incidence rates occurred in the first half of the year, with a peak in March – May (Figure 5). It is unknown why this occurred.
- Similar to previous years, the majority of reported cases were among non-B (n=43) and unknown serotypes (n=27) (Figures 6, 7, 8). Of the 70 cases, 77% (n=54) were ≥15 years of age and were not investigated further. Data on race/ethnicity and location is missing for many of the cases (Figure 3).



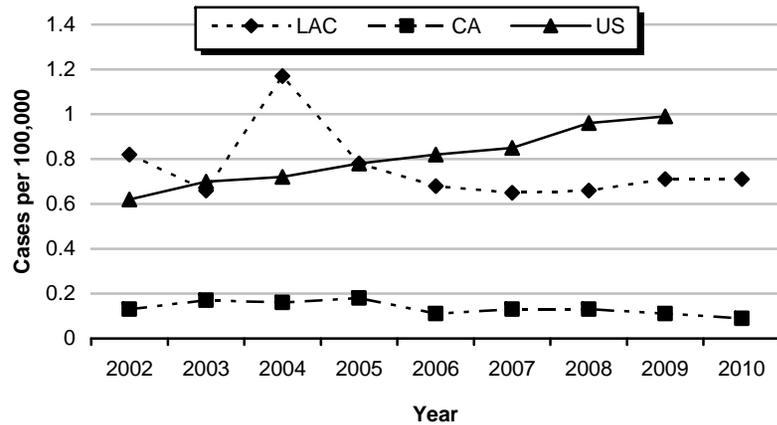
**Reported H. Influenzae Cases and Rates\* per 100,000 by Age Group, Race/Ethnicity, and SPA  
Los Angeles County, 2006-2010**

	2006 (N=66)			2007 (N=63)			2008 (N=64)			2009 (N=69)			2010 (N=70)		
	No.	(%)	Rate/ 100,000												
<b>Age Group</b>															
<1	4	6.1	2.8	8	12.7	5.4	6	9.4	4.3	7	10.1	5.1	9	12.8	6.4
1-4	1	1.5	0.2	1	1.6	0.2	2	3.1	0.4	4	5.8	0.7	3	4.3	0.5
5-14	2	3.0	0.1	3	4.8	0.2	3	4.7	0.2	0	0.0	0.0	4	5.7	0.3
15-34	7	10.6	0.3	7	11.1	0.2	4	6.3	0.1	7	10.1	0.2	4	5.7	0.1
35-44	5	7.6	0.3	4	6.3	0.3	5	7.8	0.3	2	2.9	0.1	6	8.6	0.4
45-54	6	9.1	0.5	7	11.1	0.5	11	17.2	0.8	8	11.6	0.6	9	12.9	0.7
55-64	6	9.1	0.7	5	7.9	0.6	2	3.1	0.2	11	15.9	1.2	9	12.9	0.9
65+	35	53.0	3.6	28	44.4	2.8	31	48.4	3.0	30	43.5	2.8	26	37.1	2.5
Unknown	0	0.0		0	0.0		0	0.0		0	0.0				
<b>Race/Ethnicity</b>															
Asian	3	4.5	0.2	1	1.6	0.1	3	4.7	0.2	3	4.4	0.2	0	0.0	0.0
Black	10	15.2	1.2	8	12.7	0.9	2	3.1	0.2	6	8.7	0.7	2	2.9	0.2
Hispanic	17	25.8	0.4	10	15.9	0.2	13	20.3	0.3	8	11.6	0.2	15	21.4	0.3
White	9	13.6	0.3	13	20.6	0.4	9	14.1	0.3	10	14.5	0.3	20	28.6	0.7
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	27	40.9		31	49.2		37	57.8		42	60.8		33	47.1	
<b>SPA</b>															
1	2	3.0	0.6	2	3.2	0.6	0	0.0	0.0	2	2.9	0.5	4	5.7	1.1
2	11	16.7	0.5	13	20.6	0.6	7	10.9	0.3	16	23.2	0.7	26	37.1	1.2
3	7	10.6	0.4	3	4.8	0.2	10	15.6	0.6	7	10.1	0.4	4	5.7	0.2
4	6	9.1	0.5	8	12.7	0.6	8	12.5	0.6	5	7.3	0.4	7	10.0	0.6
5	11	16.7	1.7	8	12.7	1.2	4	6.3	0.6	2	2.9	0.3	2	2.9	0.3
6	10	15.2	1.0	12	19.0	1.1	10	15.6	0.9	8	11.6	0.8	4	5.7	0.4
7	10	15.2	0.7	8	12.7	0.6	10	15.6	0.7	11	15.9	0.8	6	8.6	0.4
8	6	9.1	0.5	6	9.5	0.5	9	14.1	0.8	7	10.2	0.6	7	10.0	0.6
Unknown	3	4.5		3	4.8		6	9.4		11	15.9		10	14.3	

\*Rates calculated based on less than 19 cases or events are considered unreliable.

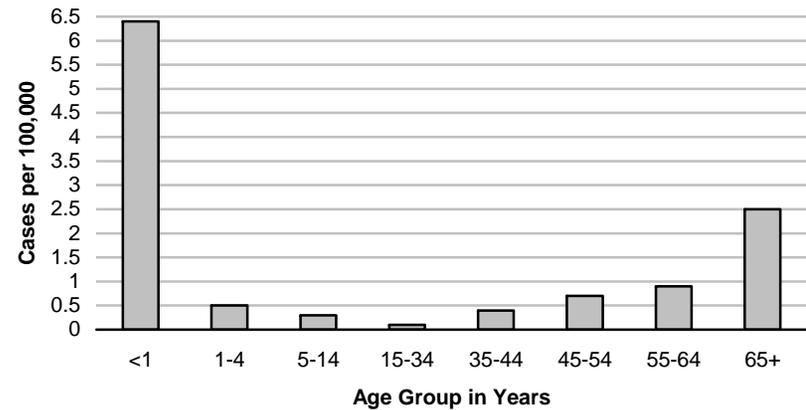


**Figure 1. Incidence Rates of *H. influenzae* Invasive Disease US, CA and LAC, 2001-2010\***

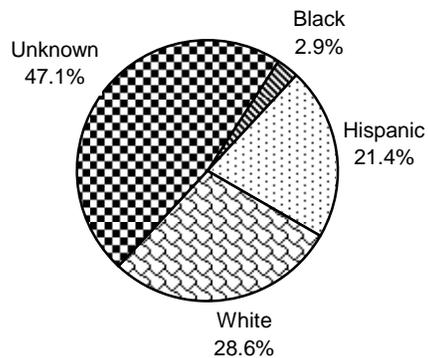


\*The incidence rates for CA only includes cases aged <30 years (2001-2006) and cases aged <15 years (2007-2010).

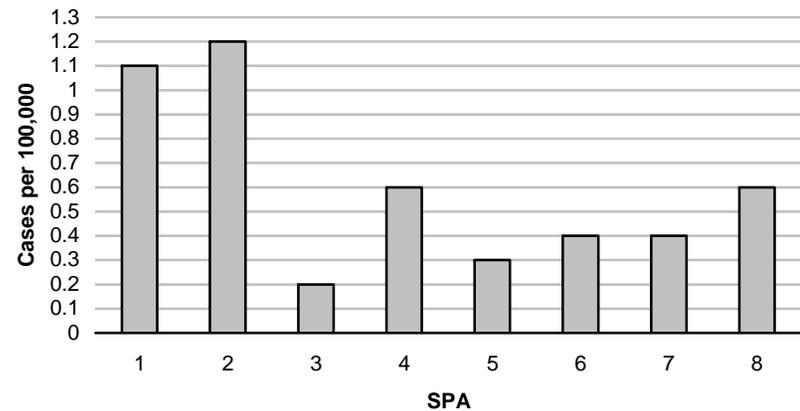
**Figure 2. Incidence Rates of *H. influenzae* Invasive Disease by Age Group LAC, 2010 (N=70)**



**Figure 3. Percent Cases of *H. influenzae* Invasive Disease by Race/Ethnicity, LAC, 2010 (N=70)**

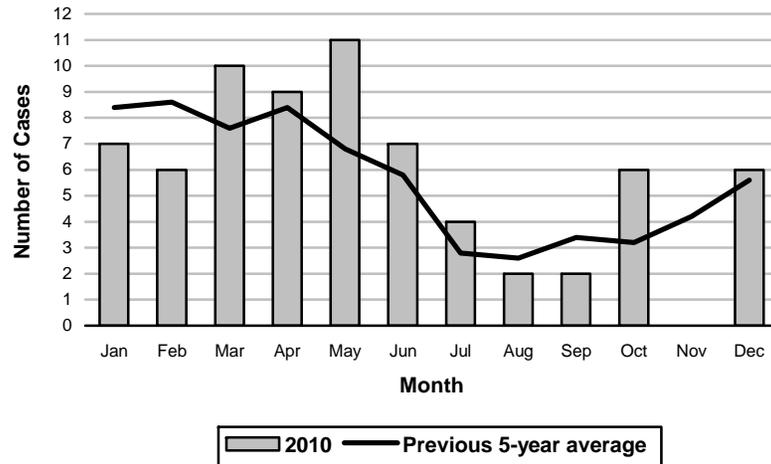


**Figure 4. Incidence Rates of *H. influenzae* Invasive Disease by SPA, LAC, 2010 (N=70)**

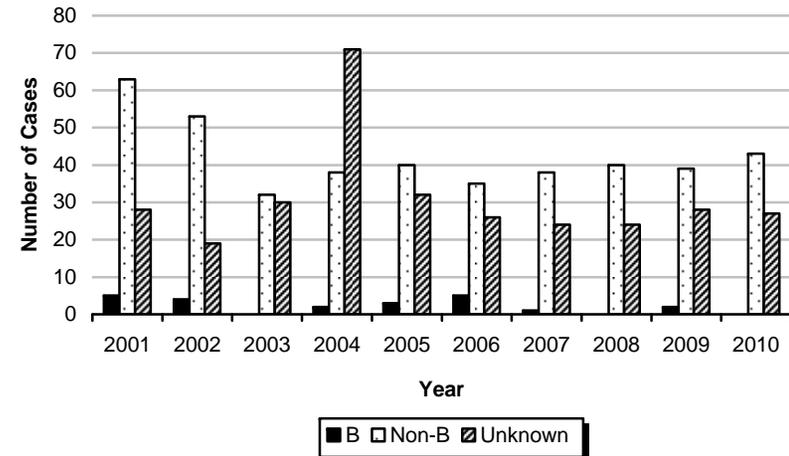




**Figure 5. Reported *H. influenzae* Invasive Disease Cases by Month of Onset, LAC, 2010 (N=70)**



**Figure 6. Reported *H. influenzae* Invasive Disease Cases by Serotype, LAC, 2001-2010**

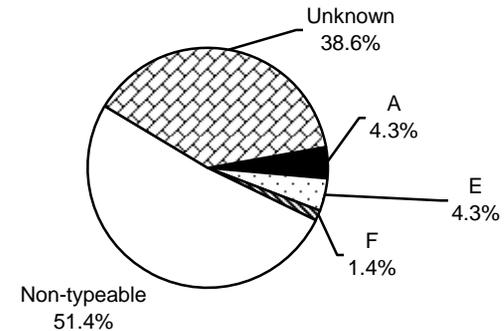


**Figure 7. Reported *H. influenzae* Invasive Disease Cases by Serotype, 2010 (N=70) vs. Previous 5-Year Average**

	B		Non-B		Unknown	
	2010	Previous 5-Year Average	2010	Previous 5-Year Average	2010	Previous 5-Year Average
<b>Total Cases</b>	0	2.2	43	38.4	27	26.8
<b>Age at Onset (years)</b>						
Mean	--	44.7	38.5	48.5	64.1	65.7
Median	--	40.9	45.0	55.0	64.0	69.7
Range	---	<1 - 73	<1 - 91	<1 - 99	27 - 90	<1 - 99
<b>Case Fatality</b>	--	0.0%	0.0	5.2%	3.7 <sup>1</sup>	9.7%

<sup>1</sup> One death was reported. The case was  $\geq 15$  years of age so no further investigation was conducted.

**Figure 8. Percent Cases of *H. influenzae* Invasive Disease by Serotype LAC, 2010 (N=70)**





## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	69
Annual Incidence <sup>a</sup> LA County California United States	0.71
Age at Diagnosis Mean Median Range	53.5 years 61.0 years <1 – 99 years

<sup>a</sup>Cases per 100,000 population.

### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. Invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Transmission is via respiratory secretions of infected individuals. There are six encapsulated, typeable strains (a–f), as well as unencapsulated, nontypeable strains. *H. influenzae* serotype B (Hib) is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective. Thus, determining the serotype on laboratory specimens for all suspect cases is critical. *H. influenzae* invasive disease primarily affects infants and elderly persons, as well as immunocompromised individuals. Since June 2007, the only cases of invasive *H. influenzae* investigated in LAC are those in persons less than 15 years of age.

#### Immunization Recommendations:

- Prior to the introduction of the Hib conjugate vaccine in 1990, most cases of invasive disease in children were caused by serotype B.
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses (2 or 3) depends on the brand of vaccine used.
- A booster dose is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series. In 2008, a vaccine shortage resulted in CDC interim guidelines calling for a temporary deferral of the booster dose except to children in special high risk groups. However, as of July 2009, increasing vaccine supply led to the CDC's recommendation that the booster dose be reinstated.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### 2009 TRENDS AND HIGHLIGHTS

- Two serotype B cases were identified (Figures 6, 7, 8). Neither of the cases had a documented history of Hib vaccination.
- As in previous years, the highest incidence rates occurred in the <1 and 65+ age groups (Figure 2). The two serotype B cases were in the 45-64 age range (Figure 7).
- None of the cases were linked. Service Planning Area (SPA) 6 and SPA 7 reported the highest incidence rates (Figure 4). The two serotype B cases resided in SPA 6 and SPA 8.
- The highest incidence rates occurred in January, April, and December (Figure 5). The two serotype B cases had onsets in January and December. In the previous five years, a peak in incidence occurred in March. It is unknown why in 2009 the peak occurred in April (Figure 5).
- Similar to previous years, the majority of reported cases were among non-B (n=39) and unknown serotypes (n=28) (Figures 6, 7, 8). Of the 69 cases, 84% (n=58) were ≥15 years of age and were not investigated further. Data on race/ethnicity and location is missing for many of the cases.



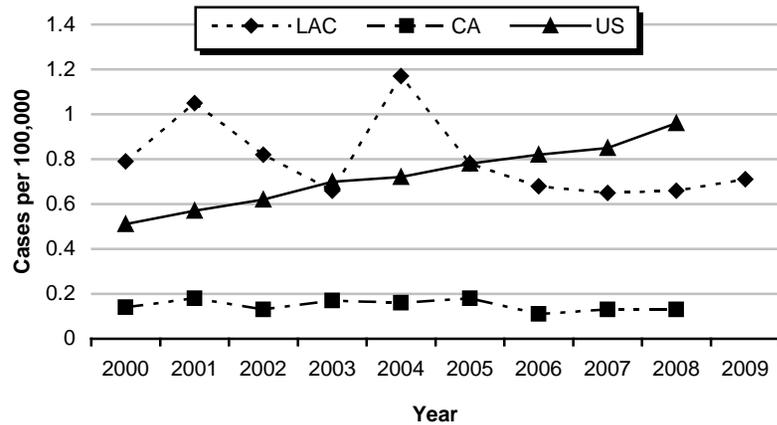
**Reported H. Influenzae Cases and Rates\* per 100,000 by Age Group, Race/Ethnicity, and SPA  
Los Angeles County, 2005-2009**

	2005 (N=75)			2006 (N=66)			2007 (N=63)			2008 (N=64)			2009 (N=69)		
	No.	(%)	Rate/ 100,000												
<b>Age Group</b>															
<1	8	10.7	5.7	4	6.1	2.8	8	12.7	5.4	6	9.4	4.3	7	10.1	5.1
1-4	2	2.7	0.3	1	1.5	0.2	1	1.6	0.2	2	3.1	0.4	4	5.8	0.7
5-14	3	4.0	0.2	2	3.0	0.1	3	4.8	0.2	3	4.7	0.2	0	0.0	0.0
15-34	3	4.0	0.1	7	10.6	0.3	7	11.1	0.2	4	6.3	0.1	7	10.1	0.2
35-44	6	8.0	0.4	5	7.6	0.3	4	6.3	0.3	5	7.8	0.3	2	2.9	0.1
45-54	7	9.3	0.6	6	9.1	0.5	7	11.1	0.5	11	17.2	0.8	8	11.6	0.6
55-64	6	8.0	0.7	6	9.1	0.7	5	7.9	0.6	2	3.1	0.2	11	15.9	1.2
65+	40	53.3	4.2	35	53.0	3.6	28	44.4	2.8	31	48.4	3.0	30	43.5	2.8
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
<b>Race/Ethnicity</b>															
Asian	4	5.3	0.3	3	4.5	0.2	1	1.6	0.1	3	4.7	0.2	3	4.4	0.2
Black	7	9.3	0.8	10	15.2	1.2	8	12.7	0.9	2	3.1	0.2	6	8.7	0.7
Hispanic	16	21.3	0.4	17	25.8	0.4	10	15.9	0.2	13	20.3	0.3	8	11.6	0.2
White	28	37.3	1.0	9	13.6	0.3	13	20.6	0.4	9	14.1	0.3	10	14.5	0.3
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	20	26.7		27	40.9		31	49.2		37	57.8		42	60.8	
<b>SPA</b>															
1	0	0.0	0.0	2	3.0	0.6	2	3.2	0.6	0	0.0	0.0	2	2.9	0.5
2	18	24.0	0.8	11	16.7	0.5	13	20.6	0.6	7	10.9	0.3	16	23.2	0.7
3	10	13.3	0.6	7	10.6	0.4	3	4.8	0.2	10	15.6	0.6	7	10.1	0.4
4	12	16.0	1.0	6	9.1	0.5	8	12.7	0.6	8	12.5	0.6	5	7.3	0.4
5	4	5.3	0.6	11	16.7	1.7	8	12.7	1.2	4	6.3	0.6	2	2.9	0.3
6	10	13.3	1.0	10	15.2	1.0	12	19.0	1.1	10	15.6	0.9	8	11.6	0.8
7	8	10.7	0.6	10	15.2	0.7	8	12.7	0.6	10	15.6	0.7	11	15.9	0.8
8	6	8.0	0.5	6	9.1	0.5	6	9.5	0.5	9	14.1	0.8	7	10.2	0.6
Unknown	7	9.3		3	4.5		3	4.8		6	9.4		11	15.9	

\*Rates calculated based on less than 19 cases or events are considered unreliable.

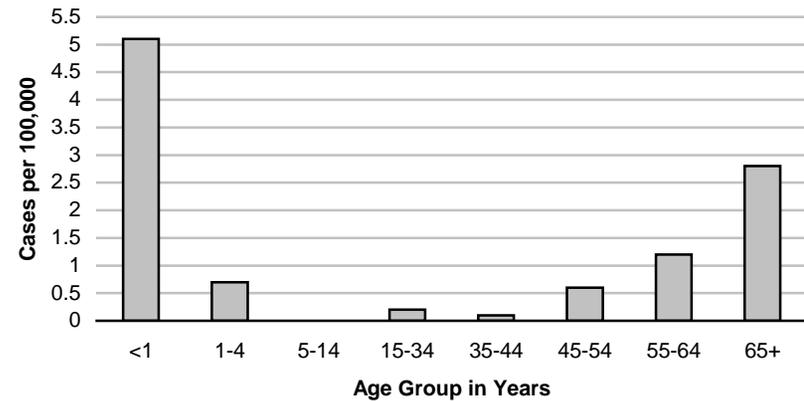


**Figure 1. Incidence Rates of *H. influenzae* Invasive Disease US, CA and LAC, 2000-2009\***

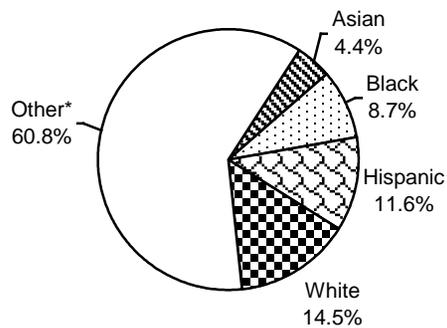


\*The incidence rates for CA only includes cases aged <30 years (2000-2006) and cases aged <15 years (2007-2009).

**Figure 2. Incidence Rates of *H. influenzae* Invasive Disease by Age Group LAC, 2009 (N=69)**

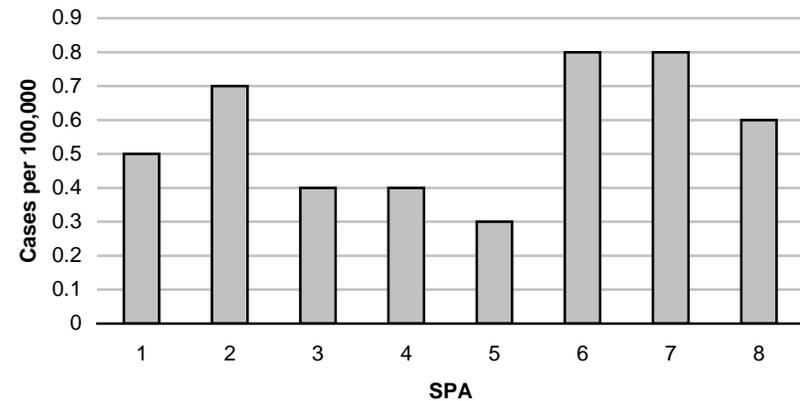


**Figure 3. Percent Cases of *H. influenzae* Invasive Disease by Race/Ethnicity, LAC, 2009 (N=69)**



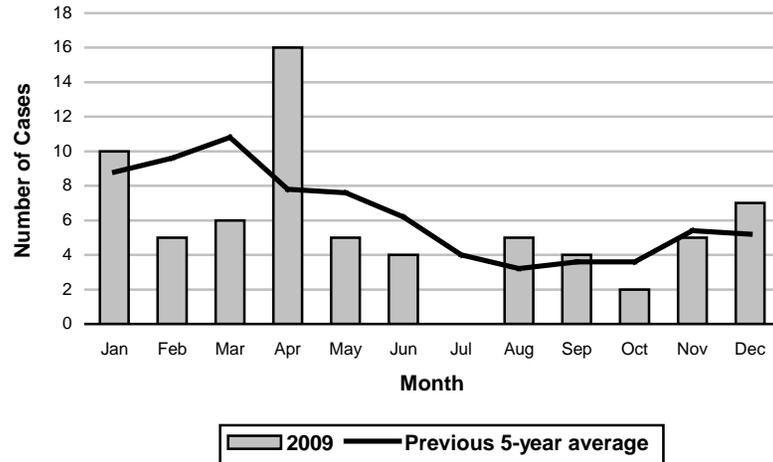
\* Other includes Native American and any additional racial/ethnic group that cannot be categorized as Asian, black, Hispanic, white, and/or unknown.

**Figure 4. Incidence Rates of *H. influenzae* Invasive Disease by SPA, LAC, 2009 (N=69)**

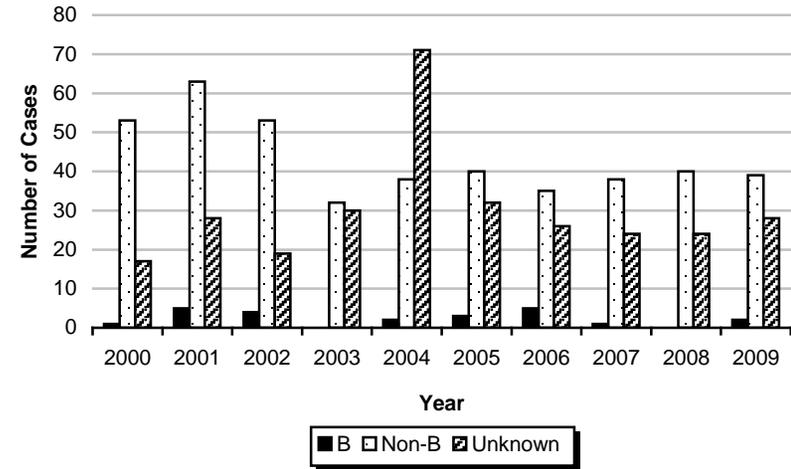




**Figure 5. Reported *H. influenzae* Invasive Disease Cases by Month of Onset, LAC, 2009 (N=69)**



**Figure 6. Reported *H. influenzae* Invasive Disease Cases by Serotype, LAC, 2000-2009**



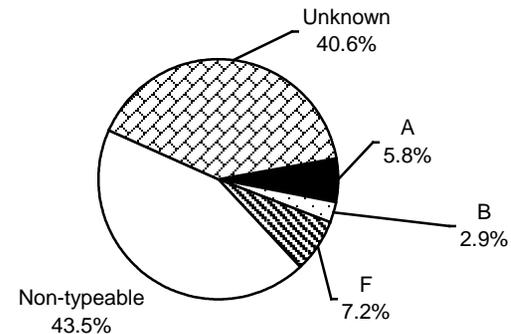
**Figure 7. Reported *H. influenzae* Invasive Disease Cases by Serotype, 2009 (N=69) vs. Previous 5-Year Average**

	B		Non-B		Unknown	
	2009	Previous 5-Year Average	2009	Previous 5-Year Average	2009	Previous 5-Year Average
<b>Total Cases</b>	2	2.2	39	38.2	28	35.4
<b>Age at Onset (years)</b>						
Mean	52.5	35.0	46.7	45.6	62.9	67.2
Median	52.5	31.1	55.0	48.5	69.0	70.1
Range	48 - 57	<1 - 73	<1 - 99	<1 - 99	1 - 98	<1 - 99
<b>Case Fatality</b>	0%	9.1%	2.6% <sup>1</sup>	4.7%	7.1% <sup>2</sup>	9.0%

<sup>1</sup> One death was reported. The case was <1 year of age, had multiple underlying medical conditions, and was hospitalized with bacteremia, respiratory distress syndrome, and septicemia.

<sup>2</sup> Two deaths were reported. One case was age 1 and causes of death were *Haemophilus pneumoniae*, bronchopulmonary dysplasia, cosleeping, and subdural neomembrane. The other case was ≥15 years of age so no further investigation was conducted.

**Figure 8. Percent Cases of *H. influenzae* Invasive Disease by Serotype LAC, 2009 (N=69)**





## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	64
Annual Incidence <sup>a</sup>	
LA County	0.65
California <sup>b</sup>	0.13
United States <sup>c</sup>	0.96
Age at Diagnosis	
Mean	54.1 years
Median	57.0 years
Range	<1 – 99 years

<sup>a</sup>Cases per 100,000 population.

<sup>b</sup>Cases per 100,000 persons, aged less than 15 years.

<sup>c</sup>Calculated from Final 2008 Reports of Nationally Notifiable Infectious Disease, MMWR 58(31);856-857;859-869.

### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. Invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Transmission is via respiratory secretions of infected individuals. There are six encapsulated, typeable strains (a–f), as well as unencapsulated, nontypeable strains. *H. influenzae* serotype B (Hib) is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective. Thus, determining the serotype on laboratory specimens for all suspect cases is critical. *H. influenzae* invasive disease primarily affects infants and elderly persons, as well as immunocompromised individuals. Since June 2007, the only cases of invasive *H. influenzae* investigated in LAC are those in persons less than 15 years of age.

#### Immunization Recommendations:

- Prior to the introduction of the Hib conjugate vaccine in 1990, most cases of invasive disease in children were caused by serotype B.
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses (2 or 3) depends on the brand of vaccine used.

- A booster dose is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series. However, due to the vaccine shortage in 2008, the CDC issued interim guidelines that called for the temporary deferral of the booster dose except to children in special high-risk groups, such as those with asplenia, sickle cell disease, human immunodeficiency virus infection and certain other immunodeficiency syndromes, and malignant neoplasms.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### 2008 TRENDS AND HIGHLIGHTS

- The vaccine shortage and booster dose deferral in 2008 may theoretically increase the circulation of Hib bacteria. However, it did not result in increased levels of *H. influenzae* serotype B disease in LAC. Since no serotype B cases were identified, none of the cases were vaccine-preventable.
- None of the cases were linked. As in previous years, the highest incidence rates occurred in the <1 and 65+ age groups (Figure 2) and during the first six months of the year (Figure 5).
- Service Planning Area (SPA) 6 and SPA 8 reported the highest incidence rates (Figure 4).
- Similar to previous years, the majority of reported cases were among non-B (n=40) and unknown serotypes (n=24) (Figures 6, 7, 8). Of the 64 cases, 82.8% (n=53) were ≥15 years of age and were not investigated further. Thus, data on race/ethnicity and location is missing for many of the cases.
- With the vaccine shortage extending into 2009, it remains important for all lab specimens to be serotyped in order to monitor epidemiologic trends between serotype B and other serotypes for which control measures aren't required. All children should be completely vaccinated for the primary series.



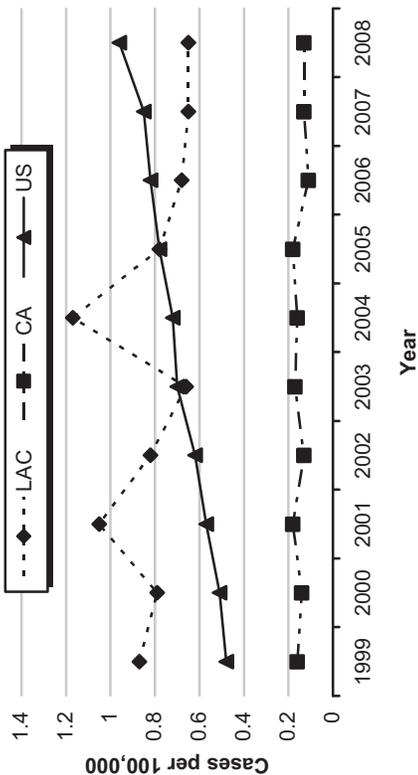
**Reported H. Influenzae Cases and Rates\* per 100,000 by Age Group, Race/Ethnicity, and SPA  
Los Angeles County, 2004-2008**

Age Group	2004 (N=111)			2005 (N=75)			2006 (N=66)			2007 (N=63)			2008 (N=64)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
<1	8	7.2	5.6	8	10.7	5.7	4	6.1	2.8	8	12.7	5.4	6	9.4	4.3
1-4	8	7.2	1.4	2	2.7	0.3	1	1.5	0.2	1	1.6	0.2	2	3.1	0.4
5-14	1	0.9	0.1	3	4.0	0.2	2	3.0	0.1	3	4.8	0.2	3	4.7	0.2
15-34	9	8.1	0.3	3	4.0	0.1	7	10.6	0.3	7	11.1	0.2	4	6.3	0.1
35-44	3	2.7	0.2	6	8.0	0.4	5	7.6	0.3	4	6.3	0.3	5	7.8	0.3
45-54	11	9.9	0.9	7	9.3	0.6	6	9.1	0.5	7	11.1	0.5	11	17.2	0.8
55-64	16	14.4	2.0	6	8.0	0.7	6	9.1	0.7	5	7.9	0.6	2	3.1	0.2
65+	55	49.5	5.8	40	53.3	4.2	35	53.0	3.6	28	44.4	2.8	31	48.4	3.0
Unknown	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
<b>Race/Ethnicity</b>															
Asian	4	3.6	0.3	4	5.3	0.3	3	4.5	0.2	1	1.6	0.1	3	4.7	0.2
Black	10	9.0	1.2	7	9.3	0.8	10	15.2	1.2	8	12.7	0.9	2	3.1	0.2
Hispanic	12	10.8	0.3	16	21.3	0.4	17	25.8	0.4	10	15.9	0.2	13	20.3	0.3
White	43	38.7	1.5	28	37.3	1.0	9	13.6	0.3	13	20.6	0.4	9	14.1	0.3
Other	2	1.8	7.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Unknown	40	36.0		20	26.7		27	40.9		31	49.2		37	57.8	
<b>SPA</b>															
1	2	1.8	0.6	0	0.0	0.0	2	3.0	0.6	2	3.2	0.6	0	0.0	0.0
2	15	13.5	0.7	18	24.0	0.8	11	16.7	0.5	13	20.6	0.6	7	10.9	0.3
3	15	13.5	0.9	10	13.3	0.6	7	10.6	0.4	3	4.8	0.2	10	15.6	0.6
4	12	10.8	1.0	12	16.0	1.0	6	9.1	0.5	8	12.7	0.6	8	12.5	0.6
5	3	2.7	0.5	4	5.3	0.6	11	16.7	1.7	8	12.7	1.2	4	6.3	0.6
6	10	9.0	1.0	10	13.3	1.0	10	15.2	1.0	12	19.0	1.1	10	15.6	0.9
7	11	9.9	0.8	8	10.7	0.6	10	15.2	0.7	8	12.7	0.6	10	15.6	0.7
8	10	9.0	0.9	6	8.0	0.5	6	9.1	0.5	6	9.5	0.5	9	14.1	0.8
Unknown	33	29.7		7	9.3		3	4.5		3	4.8		6	9.4	

\* Rates calculated based on less than 19 cases or events are considered unreliable.

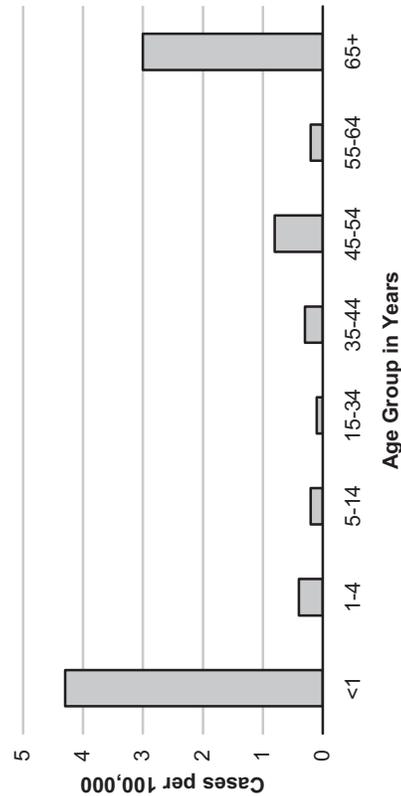


**Figure 1. Incidence Rates of *H. influenzae* Invasive Disease US, CA and LAC, 1999-2008\***

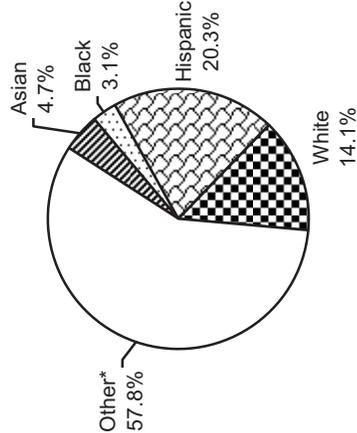


\*The incidence rates for CA only includes cases aged <30 years (1999-2006) and cases aged <15 years (2007-2008).

**Figure 2. Incidence Rates of *H. influenzae* Invasive Disease by Age Group LAC, 2008**



**Figure 3. Percent Cases of *H. influenzae* Invasive Disease by Race/Ethnicity, LAC, 2008**



\* Other includes Native American and any additional racial/ethnic group that cannot be categorized as Asian, black, Hispanic, white, and/or unknown.

**Figure 4. Incidence Rates of *H. influenzae* Invasive Disease by SPA, LAC, 2008**

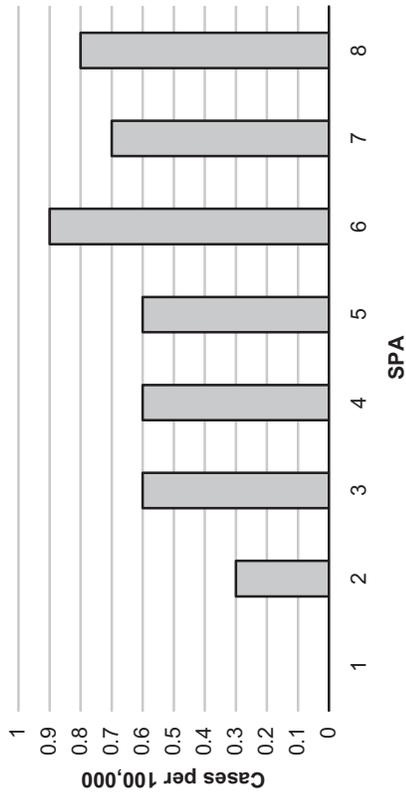




Figure 5. Reported *H. influenzae* Invasive Disease Cases by Month of Onset, LAC, 2008

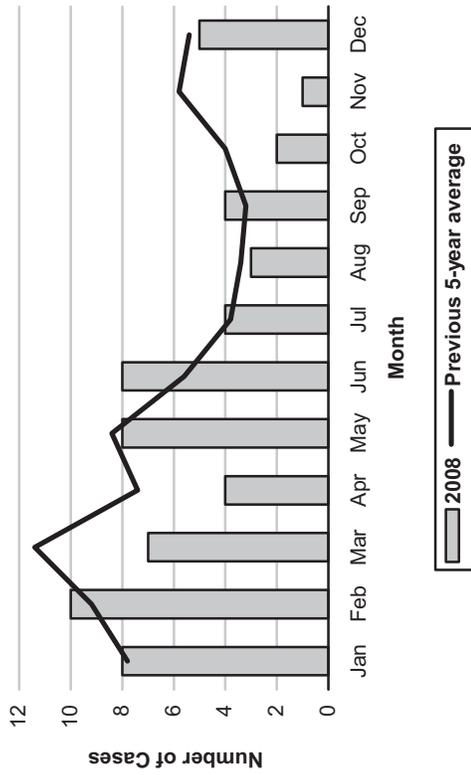


Figure 6. Reported *H. influenzae* Invasive Disease Cases by Serotype, LAC, 1999-2008

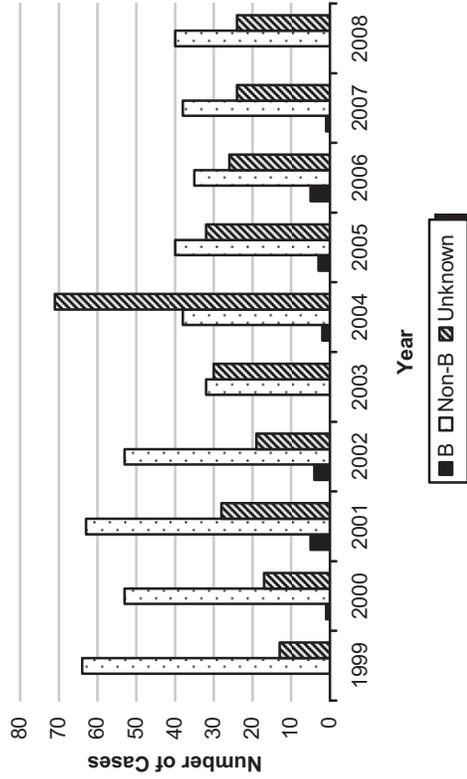


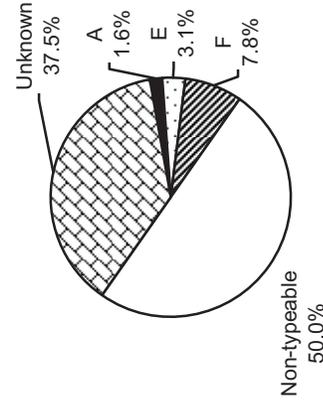
Figure 7. Reported *H. influenzae* Invasive Disease Cases by Serotype, 2008 vs. Previous 5-Year Average

	B		Non-B		Unknown	
	2008	Previous 5-Year Average	2008	Previous 5-Year Average	2008	Previous 5-Year Average
Total Cases	0	2.2	40	36.6	24	36.6
Age at Onset (years)	--	35.0	48.6	44.0	63.5	67.1
Mean	--	31.1	53.0	46.0	71.0	69.7
Median	--	<1 - 73	<1 - 99	<1 - 95	16 - 92	<1 - 100
Range	--					
Case Fatality	--	9.1%	2.5% <sup>1</sup>	5.5%	8.3% <sup>2</sup>	9.6%

<sup>1</sup> One death was reported. The case was <1 year of age, had multiple underlying medical conditions, and was hospitalized with bacteremia, pneumonia, and sepsis.

<sup>2</sup> Two deaths were reported. Both were cases ≥ 15 years of age so no further investigation was conducted.

Figure 8. Percent Cases of *H. influenzae* Invasive Disease by Serotype LAC, 2008





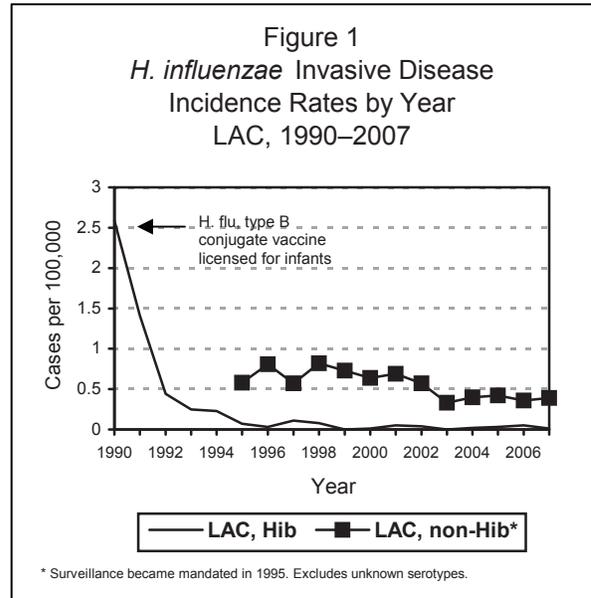
## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	63
Annual Incidence <sup>a</sup>	
LA County	0.65
California	0.13 <sup>b</sup>
United States	0.85 <sup>c</sup>
Age at Diagnosis	
Mean	50.8
Median	59.0
Range	<1 – 96.0

<sup>a</sup> Cases per 100,000 population.

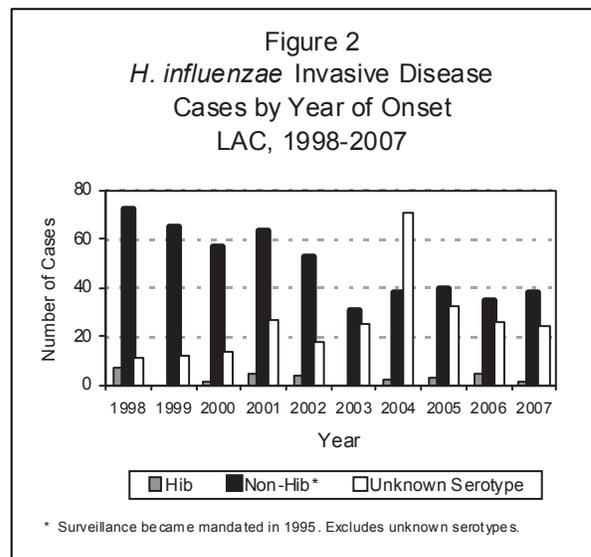
<sup>b</sup> Cases per 100,000 persons, aged less than 15 years. In California, *H. influenzae* among persons > 14 years of age is not reportable.

<sup>c</sup> Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).



### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Currently the disease primarily affects infants and the elderly as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized in the oropharynx with the organism. There are six encapsulated, typeable strains (a–f) and unencapsulated, nontypeable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae*. Type b is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective.



### DISEASE ABSTRACT

- Only one Hib case was identified in 2007.
- The majority of reported *H. influenzae* invasive disease cases is among non-Hib (n=38) and unknown (n=24) serotypes. The mean age of unknown serotype cases is higher than the mean age for non-Hib cases (Table 1, Figure 2, Figure 3).
- As previous years, non-Hib incidence peaked during the months of February to April.



**Table 1: *H. influenzae* Crude Data by Serotype, 2007 vs. Previous 5-Year Average**

	B		Non-Hib		Unknown type	
	2007	Previous 5-Year Average	2007	Previous 5-Year Average	2007	Previous 5-Year Average
Number of Cases	1	2.8	38	39.6	24	35.6
Age at Onset						
Mean	71.0	22.2	40.1	43.7	66.8	63.7
Median	71.0	14.5	41.5	44.9	68.0	67.9
Range	71.0 – 71.0	1.0 – 58.5	<1 – 89.0	<1 – 91.8	<1 – 96.0	13.6 – 98.2
LAC Case Fatality	0%	14.3%	0%	6.3%	20.8%	7.7%

**IMMUNIZATION RECOMMENDATIONS**

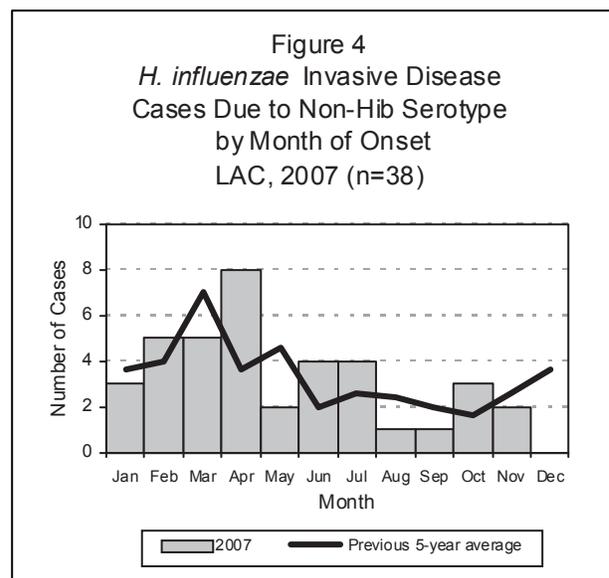
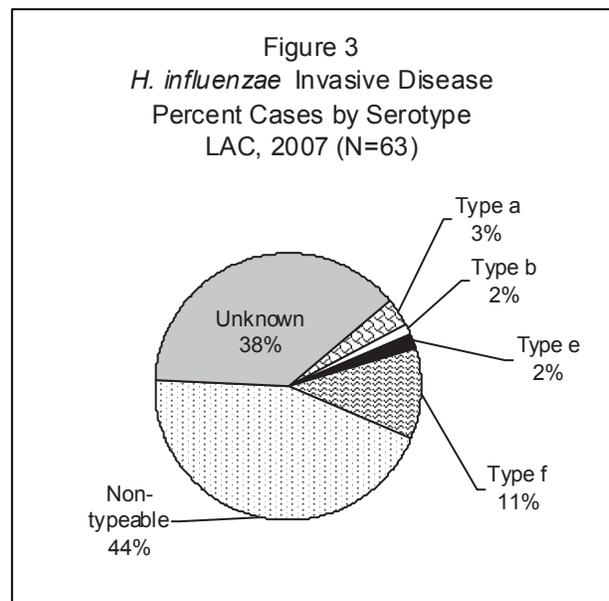
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months of age regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

**STRATIFIED DATA**

**Seasonality:** The single Hib case had disease onset in November. Similar to previous years, a temporal pattern has been evidenced in LAC with a peak in non-Hib cases during the months of February to April. These three months accounted for 47.4% (n=18) of the non-Hib cases (Figure 4).

**Age:** The single Hib case was 71 years of age unlike previous years. Among non-Hib cases, the ≥65 age group accounted for the highest proportion of cases (37%, n=14) (Figure 5). However, the mean age of non-Hib cases was 40.1 years, which is similar to the mean age of the previous five years (Table 1). Approximately 21% (n=8) of non-Hib cases were under the age of 5. Of the 24 cases with unknown serotype, 96% (n=23) were over the age of 14 and were not actively investigated for serotype as detailed in LAC’s priority investigation criteria. In addition, 54% (n=13) of these unknown serotype cases were in the ≥65 age group.

**Race/Ethnicity:** The single Hib case was white. Among the non-Hib cases which the race/ethnicity was known (n=19), Hispanics accounted for 42%





(n=8) of the cases, followed by whites (n=7; 37%), and blacks (n=4; 21%). Among the unknown serotype cases of whom race/ethnicity was identified (n=12), 42% were among whites (n=5) followed by blacks (n=4; 33%), Hispanics (n=2; 17%), and Asians (n=1; 8%) (Figure 6).

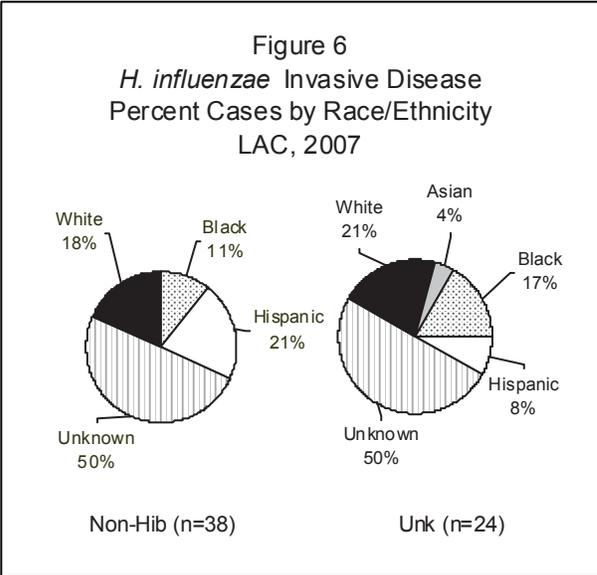
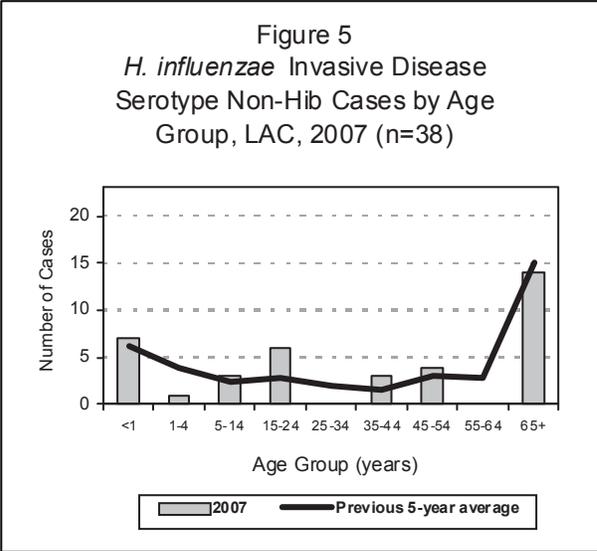
**COMMENTS**

Prior to 2007, the only cases of *H. influenzae* disease investigated in LAC were those in persons less than 30 years of age. However, since the reporting requirements changed in June 2007, the only *H. influenzae* cases investigated in LAC are those in persons less than 15 years of age. Contacts of these cases are investigated, and chemoprophylaxis is given when appropriate.

On December 13, 2007, Merck & Co., Inc., issued a voluntary recall of 11 lots of PedvaxHIB [*Haemophilus b* Conjugate Vaccine (Meningococcal Protein Conjugate)] and 2 lots of COMVAX [*Haemophilus b* Conjugate (Meningococcal Protein Conjugate) and Hepatitis B (Recombinant) Vaccine]. The recall was issued due to the concern for potential contamination of the lots with the bacteria *Bacillus cereus*. Approximately 68 Los Angeles County public and nonprofit providers received the recalled vaccine, totaling 2,440 doses. Although Sanofi Pasteur also manufactures two Hib conjugate vaccines (ActHIB and TriHIBit), the recall has resulted in a short-term Hib vaccine shortage. In response, the CDC issued interim recommendations on the use of Hib vaccine. Prior to December, the recommended vaccine schedule for Hib vaccination included a primary series (2 or 3 doses) beginning at age 2 months and a booster dose at age 12-15 months. On December 19, the DC issued interim guidelines that called for the temporary deferral of the routine booster dose of Hib vaccine except to children in special high-risk groups, such as those with asplenia, sickle cell disease, human immunodeficiency virus infection and certain other immunodeficiency syndromes, and malignant neoplasms (CDC, 2007).

A short-term deferral of vaccine is unlikely to result in increased levels of Hib disease since more than 95% of infants will develop protective antibody levels after a primary series of 2 or 3 doses. Furthermore, rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 63 *H. influenzae* cases reported in 2007, only one was a Hib case. The case had no known source of exposure and was hospitalized for 9 days with pneumonia. Since the Hib case was over 15 years of age, the case was not investigated further.

Case Fatalities: There were five fatalities among *H. influenzae* cases. All five fatalities were unknown serotypes. Three of the fatalities were male and two were female. Two were black, one was Hispanic, one was white, and one was of unknown race/ethnicity. One of the fatalities was a one-month old baby. The one-month-old case suffered acute bronchopneumonia and cardiac arrest, which ultimately led to her death. The other four fatalities (80%) ranged in age from 59 to 96 years so the cases were not investigated for further details. However, information on complications was provided for two of the cases.





The 59-year-old case suffered respiratory failure with cardiopulmonary arrest and severe hypoxic encephalopathy. The 64-year-old case had respiratory arrest. No information on complications was provided for the 92-year-old and 96-year-old cases.

## REFERENCES

Centers for Disease Control and Prevention (2007). Interim recommendations for the use of *Haemophilus influenzae* type B (Hib) conjugate vaccines related to the recall of certain lots of Hib-containing vaccines (PedvaxHIB and Comvax). *Morbidity and Mortality Weekly Report*, 56 (Dispatch), 1-2.

## ADDITIONAL RESOURCES

Additional information about *Haemophilus influenzae* invasive disease is available at:

- National Center for Immunization and Respiratory Diseases – <http://www.cdc.gov/vaccines/>
- Immunization Action Coalition – <http://www.immunize.org/>
- LAC Immunization Program – <http://www.lapublichealth.org/ip/>

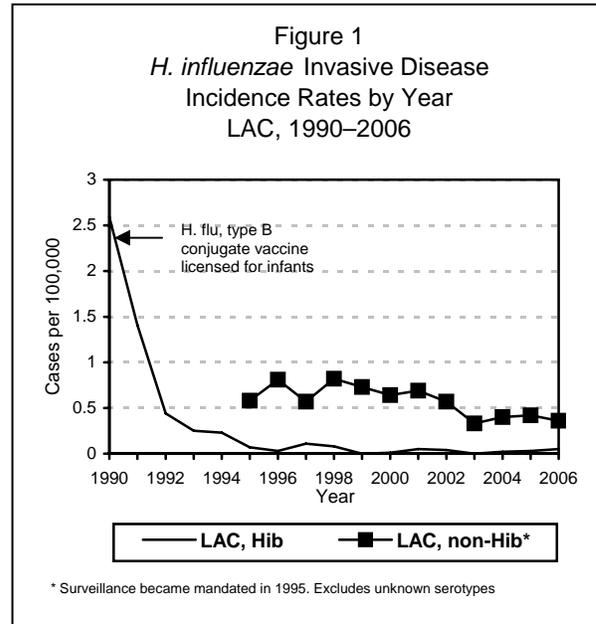
## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	66
Annual Incidence <sup>a</sup>	
LA County	0.68
California	1.01 <sup>b</sup>
United States	0.82 <sup>c</sup>
Age at Diagnosis	
Mean	59.0
Median	66.0
Range	<1 – 98.0

<sup>a</sup> Cases per 100,000 population.

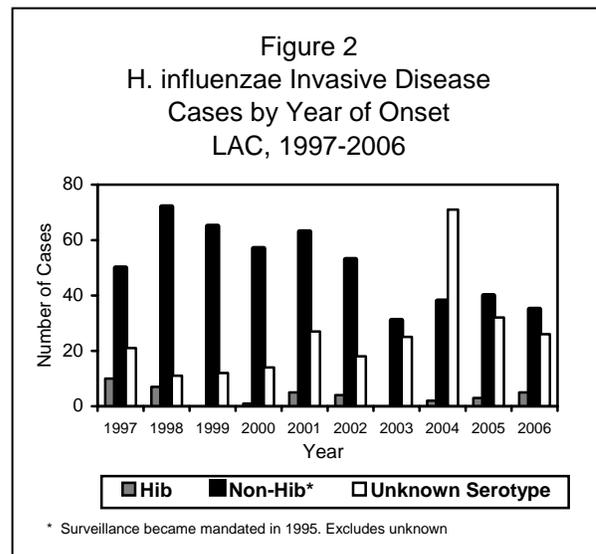
<sup>b</sup> Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.

<sup>c</sup> Calculated from 2007 Summary of notifiable diseases issues of MMWR (56:853-863).



### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Currently, the disease primarily affects infants and the elderly, as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized in the oropharynx with the organism. There are six encapsulated, typeable strains (a–f) and unencapsulated, nontypeable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae* type b is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective.



### DISEASE ABSTRACT

- Of the 5 Hib cases identified in 2006, none were completely vaccinated.
- The epidemiology of *H. influenzae* invasive disease is now being shaped by non-Hib and unknown serotypes (Table 1, Figure 2, Figure 3).
- Like previous years, non-Hib incidence peaked during the months of January to March.

**Table 1: *H. influenzae* Crude Data by Serotype, 2006 vs. Previous 5-Year Average**

	B		Non-Hib		Unknown type	
	2006	Previous 5-Year Average	2006	Previous 5-Year Average	2006	Previous 5-Year Average
No. of Cases	5	2.8	35	45.2	26	36.0
Age at Onset						
Mean	30.8	23.4	58.4	41.4	65.3	61.8
Median	34.0	14.0	71.0	40.5	65.0	67.3
Range	<1 – 73.0	1.0 – 60.5	<1 – 92.0	<1 – 92.4	18.0 – 98.0	10 – 97.2
LAC Case Fatality	0%	14.3%	11.4%	6.6%	7.7%	6.3%

**IMMUNIZATION RECOMMENDATIONS**

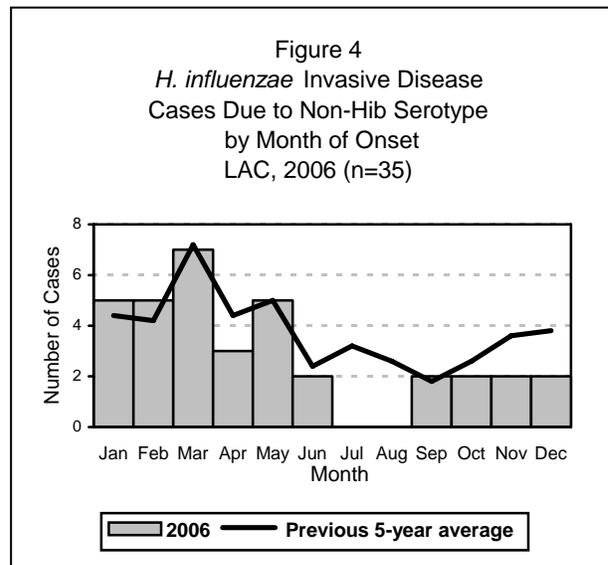
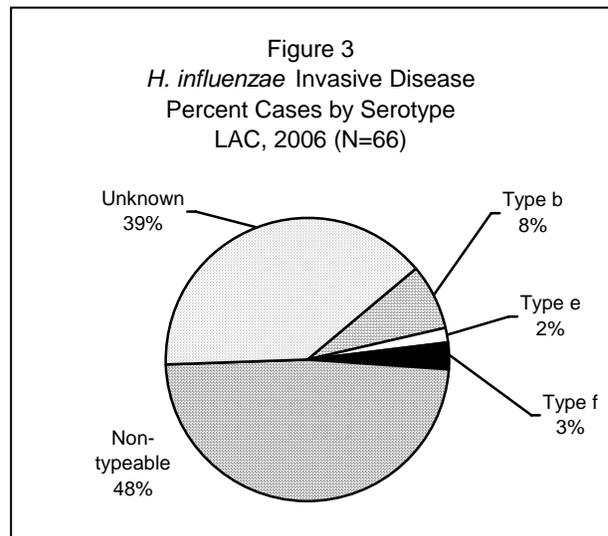
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

**STRATIFIED DATA**

**Seasonality:** The 5 Hib cases had disease onset in January (n=1), February (n=1), October (n=1), and December (n=2). Similar to previous years a temporal pattern has been evidenced in LAC, with a peak in non-Hib cases during the months of January to March. These three months accounted for 48.6% (n=17) of the non-Hib cases (Figure 4).

**Sex:** The male-to-female ratio of Hib, non-Hib, and unknown serotype cases was 1.5:1, 1.3:1, and 1.2:1 respectively.

**Age:** Of the 5 Hib cases, two were less than 6 months of age, while the remaining three were 34, 47, and 73 years of age. The number of non-Hib cases by age in 2006 followed the trend of the previous five years – the 65+ age group (60%, n=21) remaining the most affected by non-Hib invasive disease (Figure 5). Only 9% (n=3) of non-Hib cases were under the age of 5. Of the 26 cases with unknown serotype, 96% (n=25) were over the age of 30 and were not actively investigated for serotype as detailed in LAC’s priority investigation criteria. In addition, 50% (n=13) of these unknown serotype cases were in the 65+ age group.

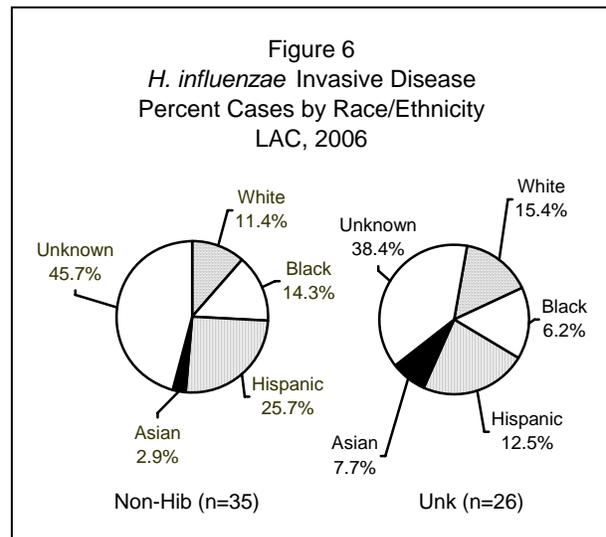
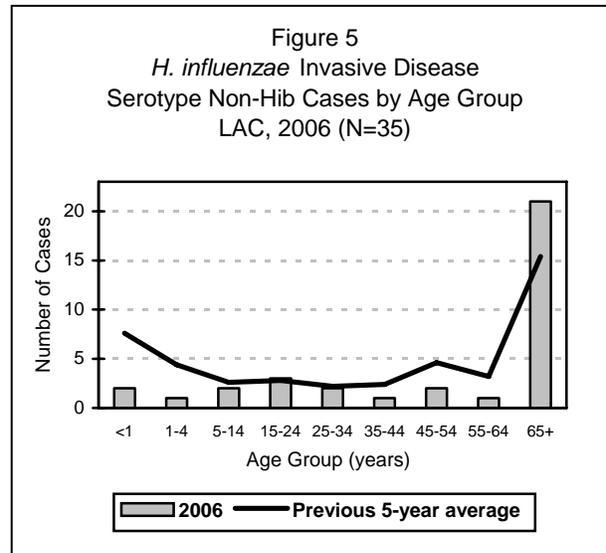


**Race/Ethnicity:** Two of the Hib cases were Hispanic, one was white, one was black, and one's race was unknown. Among the non-Hib cases where the race/ethnicity was known (n=19), Hispanics accounted for 47% (n=9) of the cases, followed by blacks (n=5, 26%), whites (n=4, 21%) and Asians (n=1, 5%). Among the unknown serotype cases of whom race/ethnicity was identified (n=16), 38% were among Hispanics (n=6), followed by whites (n=4, 25%), blacks (n=4, 25%), and Asians (n=2, 12%). (Figure 6.)

**Location:** The 5 Hib cases resided in SPA 2 (n=1), SPA 5 (n=1), and SPA 7 (n=3). The number of non-Hib cases per SPA ranged from 3 to 7. SPA 6 accounted for 7 non-Hib cases. San Fernando Valley (SPA 2) accounted for 6 cases. San Gabriel Valley (SPA 3) and East (SPA 7) accounted for 5 non-Hib cases each. South Bay (SPA 8) had 4 cases followed by Metro (SPA 4) and West (SPA 5) with 3 cases each. An additional 5% (n=2) of non-Hib cases had no identified SPA. The number of unknown serotype cases per SPA ranged from 2 to 7, with SPA 5 accounting for 7 cases. SPA 2 accounted for 4 cases. SPA 4 and SPA 6 accounted for 3 cases each followed by SPA 1, SPA 3, SPA 7, and SPA 8 with 2 cases each. One unknown serotype case did not have a residence indicated.

**COMMENTS**

The only cases of *H. influenzae* disease investigated in LAC in 2006 are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.



Rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 66 *H. influenzae* cases, only 5 (8%) were Hib cases and only 2 (3%) were less than 30 years of age. None of the cases had any known exposure to a confirmed/suspected case. Four Hib cases were hospitalized indicating the severity of type B disease.

Only one of the Hib cases (the 5-month-old) was vaccinated. Although the child was not up-to-date with immunizations, the child was too young to have completed a three-dose primary vaccination series and would not have developed protective antibody levels.

**Case Fatalities:** There were six fatalities among *H. influenzae* cases: four were non-Hib cases and two were unknown serotypes. One of the fatalities was a premature baby of a substance-abusing mother who subsequently died from various complications. The other five fatalities (83%) were in persons over the age of 30 so the cases were not investigated for further details. However, information on complications was provided for three cases; two of the cases had pneumonia and one had meningitis. Males accounted for four of the six (66.7%) case fatalities. Three of the fatalities were Hispanic, two were white, and one was of unknown race/ethnicity.

## **ADDITIONAL RESOURCES**

Additional information about *Haemophilus influenzae* invasive disease is available at:

- National Immunization Program – [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines)
- Immunization Action Coalition – [www.immunize.org](http://www.immunize.org)
- LAC Immunization Program – [www.lapublichealth.org/ip](http://www.lapublichealth.org/ip)
- Acute Communicable Disease Control Program – <http://lapublichealth.org/acd/procs/b73/b73index.htm>



## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	75
Annual Incidence <sup>a</sup>	
LA County	0.78
California	0.19 <sup>b</sup>
United States	
Age at Diagnosis	
Mean	57.2
Median	69.0
Range	<1–99.0
Case Fatality	
LA County	8.0%
United States	

<sup>a</sup> Cases per 100,000 population.

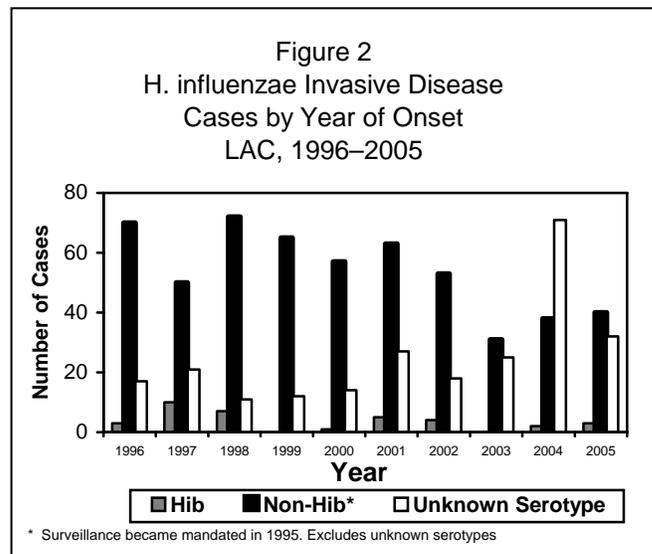
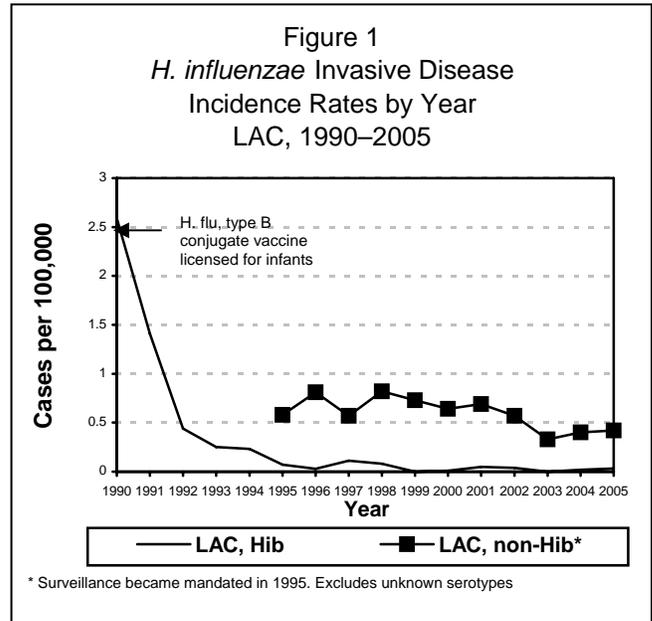
<sup>b</sup> Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.

### DESCRIPTION

*Haemophilus influenzae* is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Currently, the disease primarily affects infants and the elderly, as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized in the oropharynx with the organism. There are six encapsulated, typeable strains (a–f) and unencapsulated, nontypeable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae* type b is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective.

### DISEASE ABSTRACT

- The widespread use of the Hib vaccine since 1990 has dramatically decreased the incidence of *H. influenzae* type b disease in LAC (Figures 1, 2).
- Of the 3 Hib cases identified in 2005, only one case was completely vaccinated.
- The epidemiology of *H. influenzae* invasive disease is now being shaped by non-Hib and unknown serotypes (Table 1, Figure 2, Figure 3).





**Table 1: *H. influenzae* Crude Data by Serotype, 2005 vs. Previous 5-Year Average**

	B		Non-Hib		Unknown type	
	2005	Previous 5-Year Average	2005	Previous 5-Year Average	2005	Previous 5-Year Average
Number of Cases	3	2.4	40	47.8	32	33.0
Age at Onset						
Mean	25.7	36.2	49.0	39.3	70.5	61.8
Median	7.0	31.4	54.5	35.5	76.0	67.8
Range	1.0 – 69.0	20.0 – 62.5	Birth – 94.0	Birth - 93.0	21.0 – 99.0	6.0 – 98.0
LAC Case Fatality	0%	16.7%	10%	5.8%	6.3%	6.8%

**IMMUNIZATION RECOMMENDATIONS**

- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

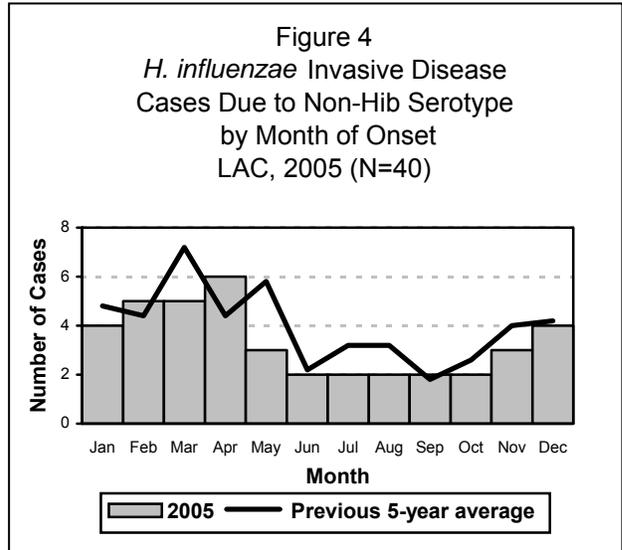
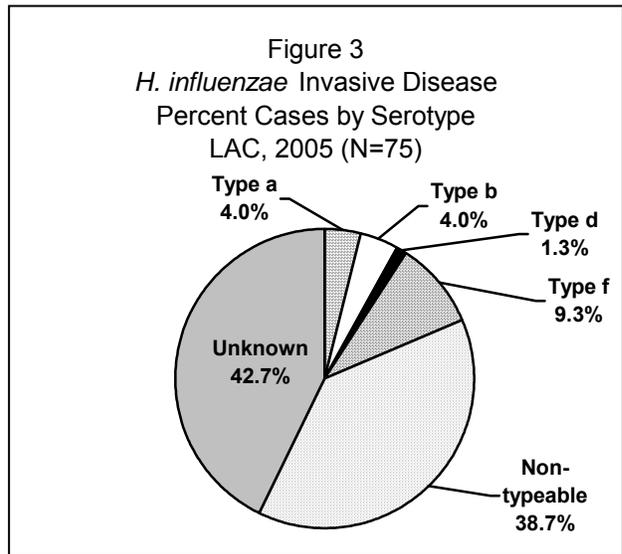
**STRATIFIED DATA**

**Seasonality:** The 3 Hib cases had disease onset in January, March, and October. Similar to previous years a temporal pattern has been evidenced in LAC, with a peak in non-Hib cases during the months of January to April. These four months accounted for 50% (n=20) of the non-Hib cases (Figure 4).

**Sex:** The male-to-female ratio of Hib, non-Hib, and unknown serotype cases was 2:1, 1:1, and 1:1.4, respectively.

**Age:** The 3 Hib cases were 1, 7, and 69 years of age. The number of non-Hib cases by age in 2005 followed the trend of the previous five years – the 65+ age group (48%, n=19) remaining the most affected by non-Hib invasive disease (Figure 5). Only 23% (n=9) of non-Hib cases were under the age of 5. Of the 32 cases with unknown serotype, 97% (n=31) were over the age of 30 and were not actively investigated for serotype as detailed in LAC’s priority investigation criteria. In addition, 63% (n=20) of these unknown serotype cases were in the 65+ age group.

**Race/Ethnicity:** Two of the Hib cases were Hispanic and one was White. Among the non-Hib cases where the race/ethnicity was known (n=29), Whites accounted for 45% (n=13) of the cases, followed by





Hispanics (n=10; 35%). Among the unknown serotype cases of whom race/ethnicity was identified (n=23), 61% were among Whites (n=14), followed by Hispanics (n=4; 17%) (Figure 6.)

**Location:** The 3 Hib cases resided in SPA 2, SPA 4, and SPA 5. The number of non-Hib cases per SPA ranged from 1 to 11. San Fernando Valley (SPA 2) accounted for 11 cases. San Gabriel Valley (SPA 3) and South (SPA 6) accounted for 6 non-Hib cases each. Metro (SPA 4) had 5 cases while East (SPA 7) and South Bay (SPA 8) had 3 cases each. West (SPA 5) reported the fewest cases (n=1). An additional 13% (n=5) of non-Hib cases had no identified SPA. The number of unknown serotype cases per SPA ranged from 2 to 6, with SPA 2 and SPA 4 accounting for 6 cases each and SPA 5 with 2 cases. SPA 7 accounted for 5 cases while SPA 3 and SPA 6 had 4 cases each. SPA 8 had 3 cases. An additional 6% (n=2) of the unknown serotype cases did not have a residence indicated. SPA 1 did not report any Hib, non-Hib, or unknown serotype cases.

**COMMENTS**

The only cases of *H. influenzae* disease investigated in LAC are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.

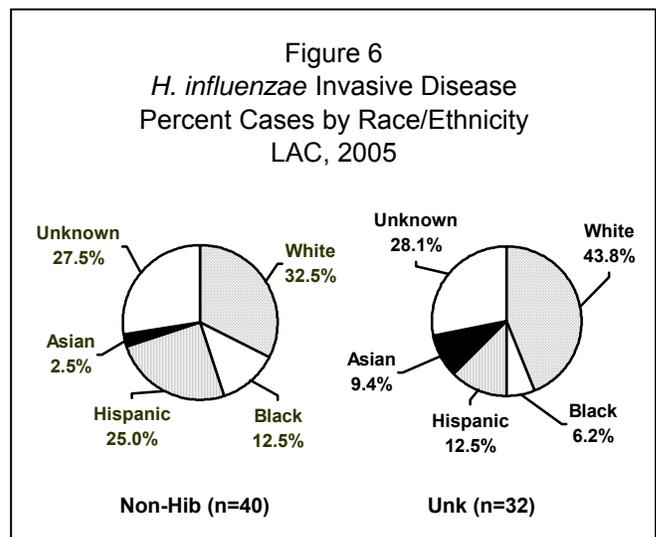
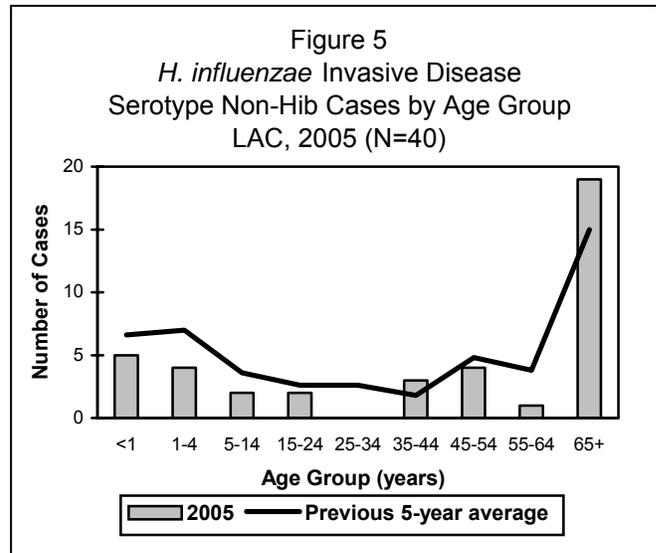
Rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 75 *H. influenzae* cases, only 3 (4%) were Hib cases. None of the cases had any known exposure to a confirmed/suspected case. All 3 Hib cases were hospitalized, two for pneumonia and one for meningitis.

Although the 7-year-old Hib case had documented evidence of being up to date with the Hib vaccination for his age, invasive Hib disease in a completely vaccinated child is very rare. More than 95% of children will develop protective antibody levels after a primary series of 2 or 3 doses. Clinical efficacy has been estimated at 95% to 100%.

**Case Fatalities:** There were six fatalities among *H. influenzae* cases: four were non-Hib cases and two were unknown serotypes. One of the fatalities was a premature baby that died on the second day of life. The other five fatalities (83%) were in persons over the age of 30 so the cases were not investigated for further details. Information on complications was provided for two cases. Both cases had pneumonia. Females accounted for five of the six (83.3%) case fatalities. Two of the fatalities were White, two were Black, one was Asian, and one was of unknown race/ethnicity.

**ADDITIONAL RESOURCES**

Information about immunization is available through the National Immunization Program at [www.cdc.gov/nip](http://www.cdc.gov/nip) and the Immunization Action Coalition at [www.immunize.org](http://www.immunize.org).





Information specific to LAC is available from LAC DHS Immunization Program at [www.lapublichealth.org/ip](http://www.lapublichealth.org/ip) and from ACDC at [www.lapublichealth.org/acd/procs/b73/b73index.htm](http://www.lapublichealth.org/acd/procs/b73/b73index.htm).



## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	111
Annual Incidence <sup>a</sup>	
LA County	1.16
California <sup>b</sup>	0.15
United States	0.72
Age at Diagnosis	
Mean	56.9
Median	63.0
Range	<1 – 98.0
Case Fatality	
LA County	5.4%
United States	

<sup>a</sup> Cases per 100,000 population.

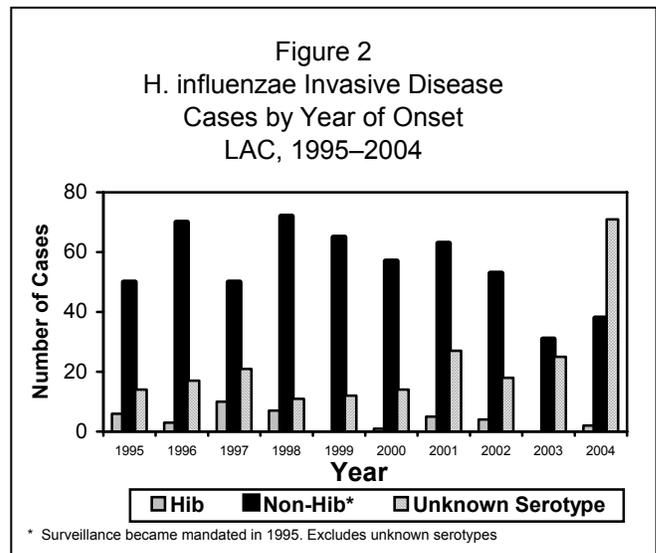
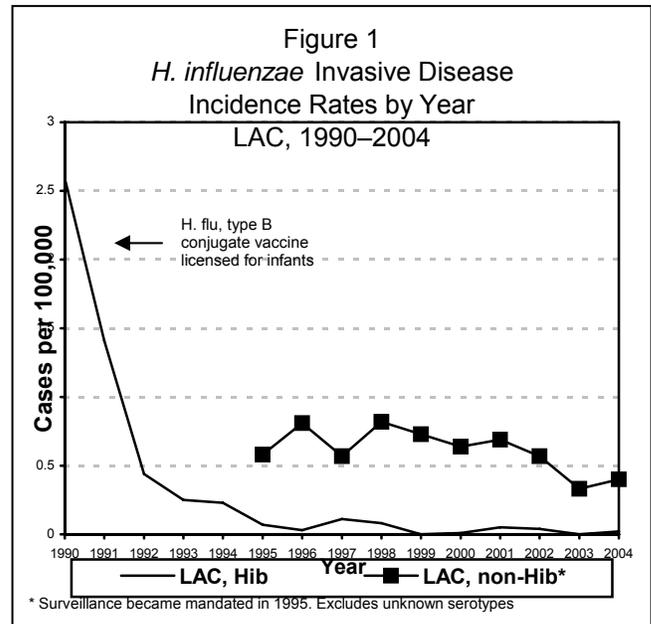
<sup>b</sup> Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.

### DESCRIPTION

*Haemophilus influenzae* is a gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Currently, the disease primarily affects infants and the elderly, as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized with the organism. There are six encapsulated, typeable strains (a–f) and unencapsulated, nontypeable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae* type b is the only serotype that is vaccine-preventable.

### DISEASE ABSTRACT

- The widespread use of the Hib vaccine since 1990 has dramatically decreased the incidence of *H. influenzae* type b disease in LAC (Figure 1, 2).
- Although more *H. influenzae* cases were reported in 2004 than in previous years, only 2 Hib cases were identified.
- The epidemiology of *H. influenzae* invasive disease is now being shaped by non-Hib and unknown





serotypes (Table 1, Figure 3).

**Table 1: *H. influenzae* Crude Data by Serotype, 2004 vs. Previous 5-Year Average**

	B		Non-Hib		Unknown type	
	2004	Previous 5-Year Average	2004	Previous 5-Year Average	2004	Previous 5-Year Average
Number of Cases	2	2.0	38	53.0	71	21.4
Age at Onset						
Mean	14.0	43.6	32.8	42.5	71.0	60.7
Median	14.0	37.2	23.0	42.8	71.0	67.6
Range	4.0 – 24.0	25.3 – 75.3	Birth – 96.0	Birth – 93.0	30.0 – 98.0	4.6 – 95.4
LAC Case Fatality	50%	10%	0%	6.1%	7.0%	5.8%

**IMMUNIZATION RECOMMENDATIONS**

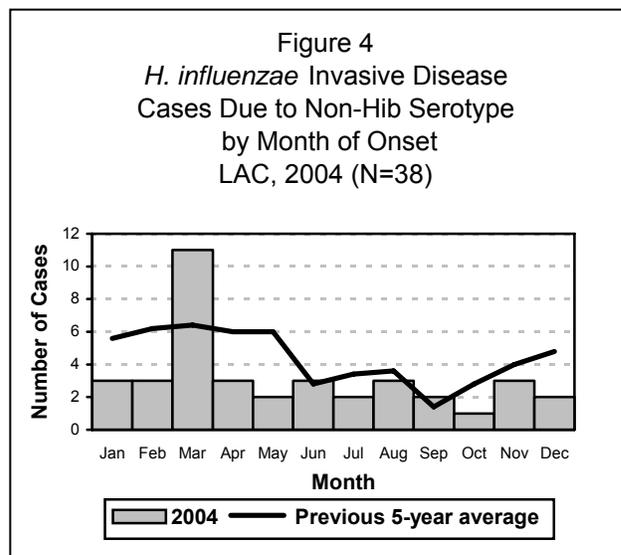
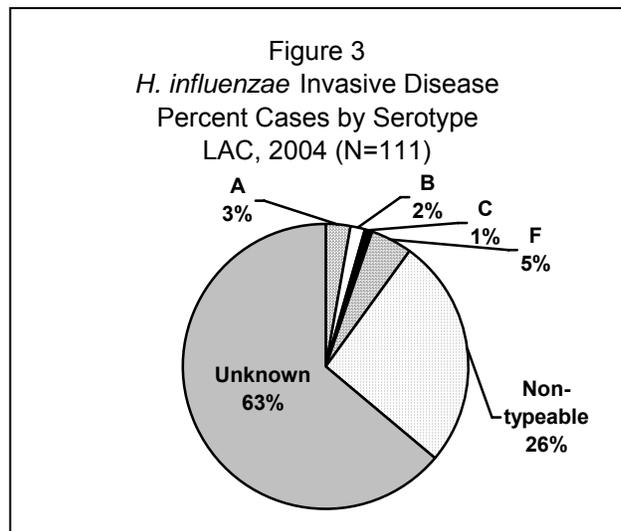
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

**STRATIFIED DATA**

**Seasonality:** The 2 Hib cases had disease onset in January and November. A temporal pattern has been evidenced in LAC, with a peak in non-Hib cases that begins in September and declines after May. However, non-Hib cases in 2004 seemed to follow an unusual pattern in comparison to previous years. With the exception of March that accounted for 29.0% (n=11) of cases, the onset of cases was distributed fairly uniformly throughout the year (Figure 4).

**Sex:** Both Hib cases occurred in males. The male-to-female ratio of non-Hib and unknown serotype cases was 1:0.8 and 1:1.2, respectively.

**Age:** The 2 Hib cases were 4 and 24 years of age. Unlike the trend of previous years, the age group most affected by non-Hib invasive disease in 2004 was the 1-4 year age group (29.0%, n=11) followed by the 65+ age group (18.4%, n=7) (Figure 5). All 71 cases with unknown serotype were over the age of 30 and were not actively investigated for serotype as detailed in LAC’s priority investigation criteria.





**Race/Ethnicity:** One of the Hib cases was Black and the other Hib case was Hispanic. Among the non-Hib cases where the race/ethnicity was known (n=27), Whites accounted for 48.1% (n=13) of the cases, followed by Hispanics (n=8; 29.6%). Among the unknown serotype cases of whom race/ethnicity was identified (n=40), 70.0% were among Whites (n=28), followed by Blacks (n=5; 12.5%) (Figure 6.)

**Location:** The 2 Hib cases resided in SPA 6 and SPA 7. The number of non-Hib cases per SPA ranged from 2 to 6. San Fernando Valley (SPA 2), San Gabriel Valley (SPA 3), Metro (SPA 4), and East (SPA 7) accounted for 6 non-Hib cases each. South (SPA 6) had 5 cases, South Bay (SPA 8) had 3 cases, and Antelope Valley (SPA 1) had 2 cases. An additional 10.5% (n=4) of non-Hib cases had no identified SPA. The number of unknown serotype cases per SPA ranged from 2 to 9, with SPA 2 and SPA 3 accounting for 9 cases each and SPA 5 with 2 cases. An additional 42.3% (n=30) of the unknown serotype cases did not have a residence indicated.

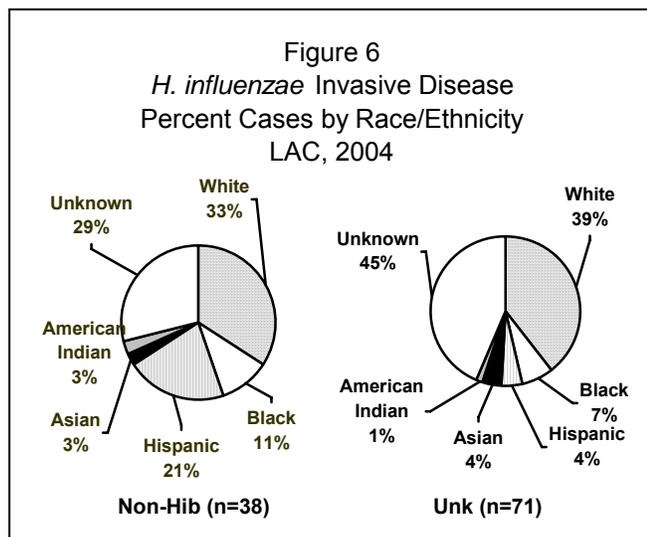
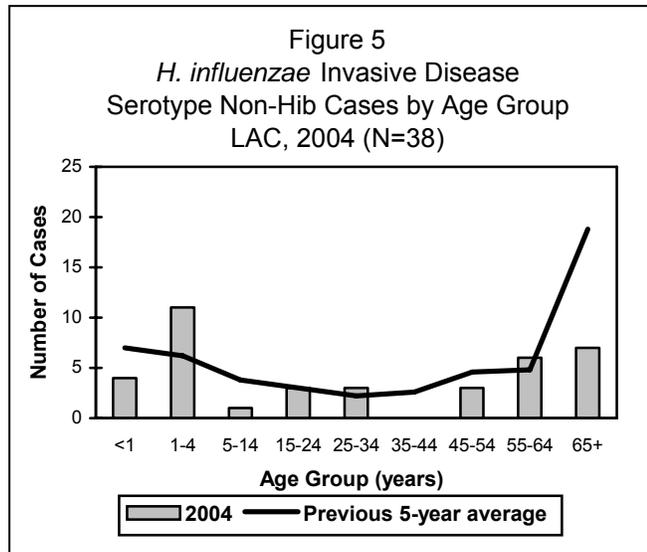
**COMMENTS**

The only cases of *H. influenzae* investigated in LAC are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.

Rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 111 cases, only 2 (1.8%) were Hib cases. Neither of the cases had any known exposure to a confirmed/suspected case. The Hib case that was 24 years old had a preexisting medical condition and subsequently died of severe bronchopneumonia. The 4 year old Hib case had meningitis but recovered.

Although the 4 year old Hib case had documented evidence of being up to date with the Hib vaccination for his age, invasive Hib disease in a completely vaccinated infant is very rare. More than 95% of infants will develop protective antibody levels after a primary series of 2 or 3 doses. Clinical efficacy has been estimated at 95% to 100%.

**Case Fatalities:** There were six fatalities among *H. influenzae* cases: one case was typed as serotype B and five were unknown serotypes. Five of the fatalities (83.3%) were in persons over the age of 30 so the cases were not investigated for further information. However, information on complications was provided for three cases. One case had bacteremia, one had meningitis, and one had pneumonia. Males accounted for four of the six case fatalities. Two of the fatalities were White, one was Black, and three were of unknown race/ethnicity.





## **ADDITIONAL RESOURCES**

Information about immunization is available through the National Immunization Program at: [www.cdc.gov/nip](http://www.cdc.gov/nip) and the Immunization Action Coalition at: [www.immunize.org](http://www.immunize.org)

Information specific to LAC is available from:

- LAC DHS Immunization Program at:  
[www.lapublichealth.org/ip](http://www.lapublichealth.org/ip)
- ACDC:  
[www.lapublichealth.org/acd/procs/b73/b73index.htm](http://www.lapublichealth.org/acd/procs/b73/b73index.htm)



## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	56
Annual Incidence <sup>a</sup>	
LA County	0.60
California <sup>b</sup>	0.17
United States	0.70
Age at Diagnosis	
Mean	49.8
Median	59.0
Range	<1–101.0
Case Fatality	
LA County	0%
United States	N/A

<sup>a</sup> Cases per 100,000 population.

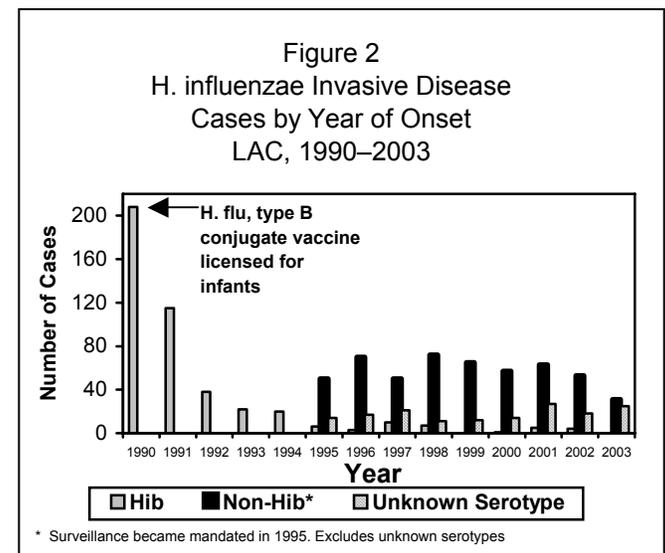
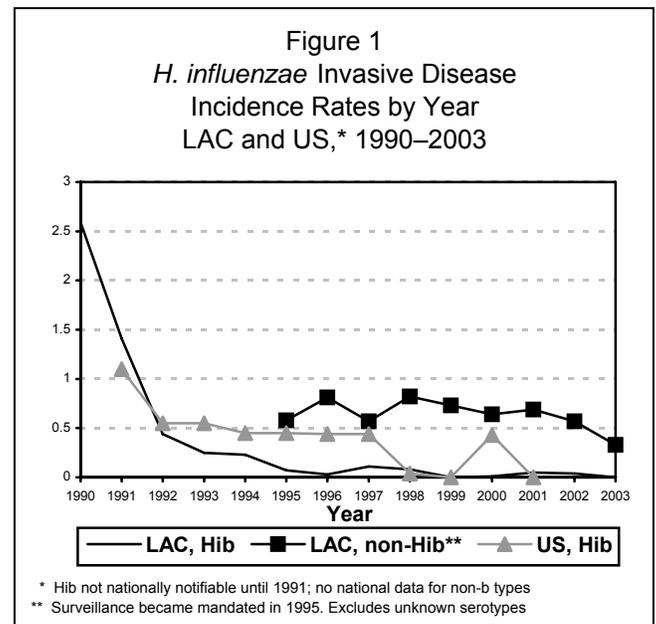
<sup>b</sup> Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.

### DESCRIPTION

*Haemophilus influenzae* is a gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. The disease primarily affects infants and the elderly, as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized with the organism. There are six encapsulated, typable strains (a–f) and unencapsulated, nontypable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae* type b is the only serotype that is vaccine-preventable.

### DISEASE ABSTRACT

- The widespread use of the Hib vaccine since 1990 has dramatically decreased the incidence of *H. influenzae* type b disease in LAC (Figure 1, 2).
- No Hib cases were identified in 2003, marking only the second time this has occurred in 13 years.
- The epidemiology of *H. influenzae* invasive disease is now being shaped by non-b and unknown serotypes (Figure 3, Table 1).





**Table 1. *H. influenzae* Crude Data by Serotype, 2003**

	B		Non-b		Unknown type	
	2003	Previous 5-Year Average	2003	Previous 5-Year Average	2003	Previous 5-Year Average
Number of Cases	0	3.4	31	61.8	25	16.8
<b>Age at Onset</b>						
Mean	-	43.0	39.5	45.5	63.2	61.9
Median	-	37.9	40.0	48.2	72.0	68.2
Range	-	19.3-76.5	Birth-86.0	Birth-95.0	Birth-101.0	7.4-91.8
LAC Case Fatality	-	5.9%	0%	6.1%	0%	8.3%

**IMMUNIZATION RECOMMENDATIONS**

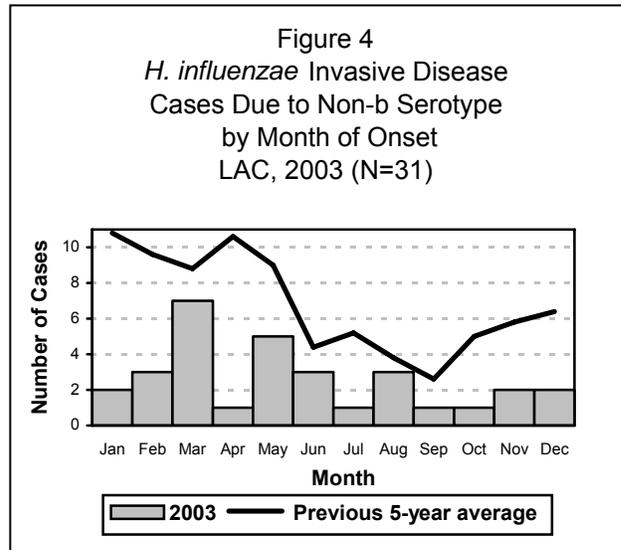
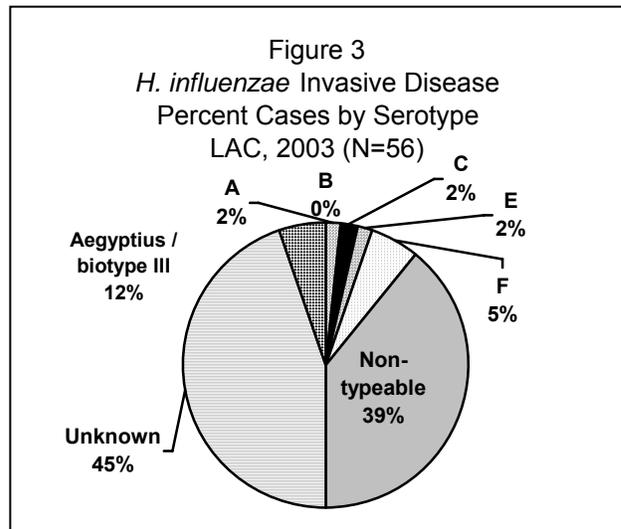
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

**STRATIFIED DATA**

**Seasonality:** A temporal pattern has been evidenced in LAC, with a peak in non-Hib cases that begins in September and declines after April. However, non-Hib cases in 2003 seemed to follow an unusual pattern in comparison to previous years, with the onset of cases distributed fairly uniformly throughout the year. March and May accounted for 38.7% (n=12) of cases (Figure 4).

**Sex:** The male-to-female ratio of non-Hib and unknown serotype cases was 1:0.9 and 1:0.6, respectively.

**Age:** The number of cases by age in 2003 follows the trend of previous years—the 65+ age group remaining the most affected by non-Hib invasive disease over the last six years (Figure 5). However, 45.2% (n=14) of non-Hib cases in 2003 were individuals younger than 25 years. Of the 25 cases with unknown serotype, 21 (84%) were over the age of 30 and were not actively investigated for serotype as detailed in LAC’s priority investigation criteria. In addition, 72% (n=18) of these individuals were over the age of 54 years.





**Race/Ethnicity:** In cases where the race/ethnicity was known, Latinos accounted for 38.5% (n=10) of the non-Hib cases, followed by Whites (n=9; 34.6%). Among the unknown serotype cases of whom race/ethnicity was identified, 41.2% were among Whites (n=7), followed by Latinos (n=5; 29.4%) (Figure 6.)

**Location:** Eleven (35.5%) of the non- Hib cases resided in two SPAs: San Fernando Valley (SPA 2) and South (SPA 6), however, an additional 35.5% of non-Hib cases had no identified SPA. The vast majority (96%) of the unknown serotype cases did not have a residence indicated as well.

**COMMENTS**

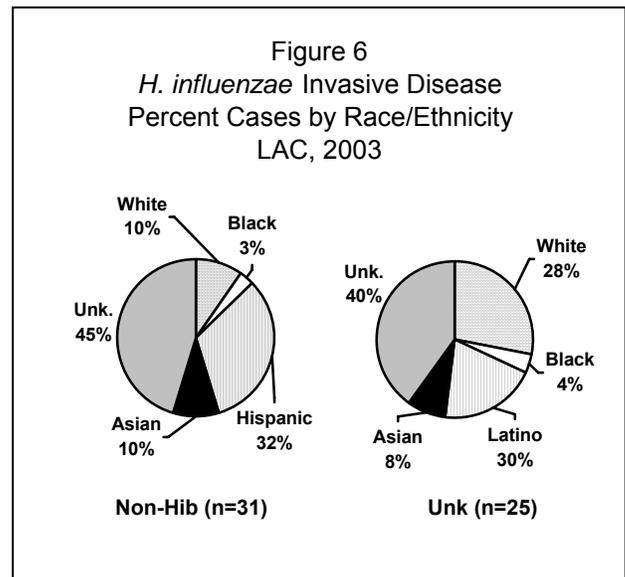
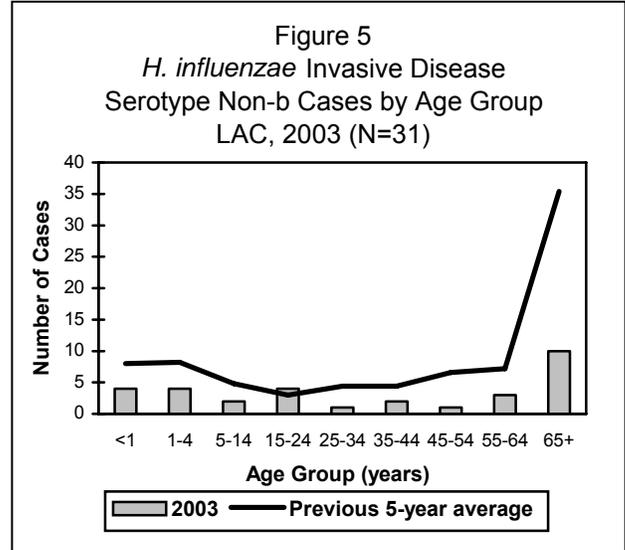
The only cases of *H. influenzae* investigated in LAC are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.

**ADDITIONAL RESOURCES**

Information about immunization is available through the National Immunization Program at: [www.cdc.gov/nip](http://www.cdc.gov/nip) and the Immunization Action Coalition at: [www.immunize.org](http://www.immunize.org)

Information specific to LAC is available from:

- LAC DHS Immunization Program at: [www.lapublichealth.org/ip](http://www.lapublichealth.org/ip)
- ACDC: [www.lapublichealth.org/acd/procs/b73/b73index.htm](http://www.lapublichealth.org/acd/procs/b73/b73index.htm)





## HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	75
Annual Incidence	
LA County	0.8
California <sup>b</sup>	0.1
United States	0.6
Age at Diagnosis	
Mean	40
Median	38
Range	<1–97 years
Case Fatality	
LA County	6.7%
United States	N/A

<sup>a</sup> Cases per 100,000 population.

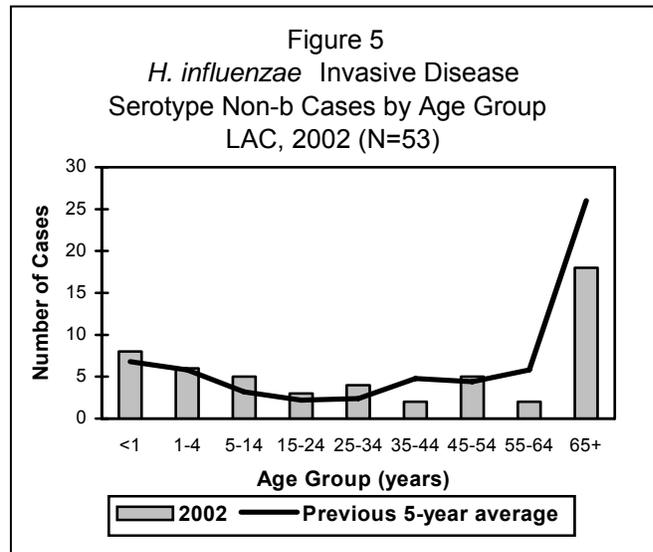
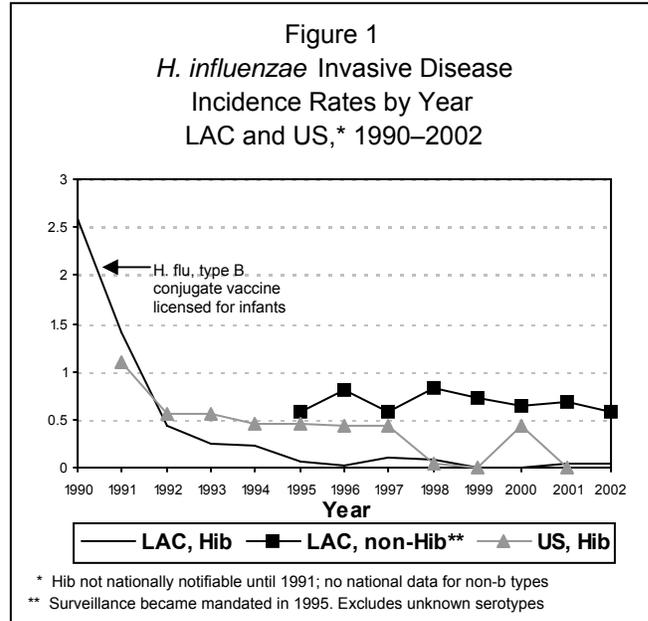
<sup>b</sup> Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.

### DESCRIPTION

*Haemophilus influenzae* is a gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. The disease primarily affects infants and the elderly, as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized with the organism. There are six encapsulated, typable strains (a–f) and unencapsulated, nontypable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae* type b is the only serotype that is vaccine-preventable.

### DISEASE ABSTRACT

- The widespread use of the Hib vaccine since 1990 has dramatically decreased the incidence of *H. influenzae* type b disease in LAC.
- The epidemiology of *H. influenzae* invasive disease is now being shaped by non-b and unknown serotypes.





**Table 1: *H. influenzae* Crude Data by Serotype, 2002**

	<b>B</b>	<b>Non-b</b>	<b>Unknown type</b>
Number of Cases	4	53	18
LAC Incidence	N/A	0.58	0.19
Age at Onset			
Mean	20	39	49
Median	5	36	57
Range	1–70	Birth–92	Birth–97
LAC Case Fatality	25%	3.8%	11.1%

### IMMUNIZATION RECOMMENDATIONS

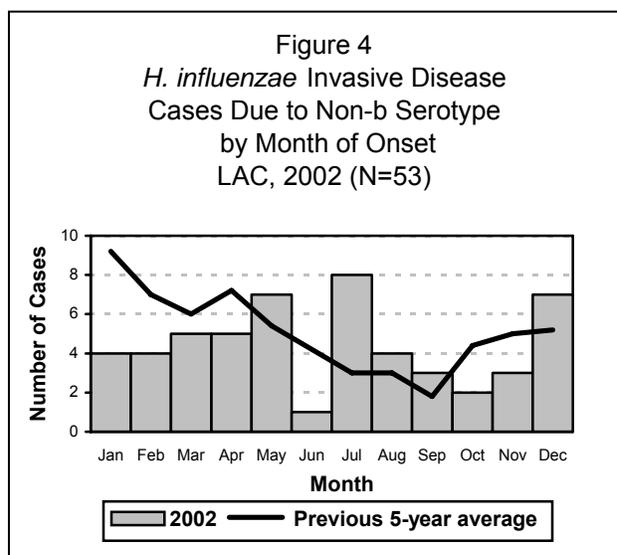
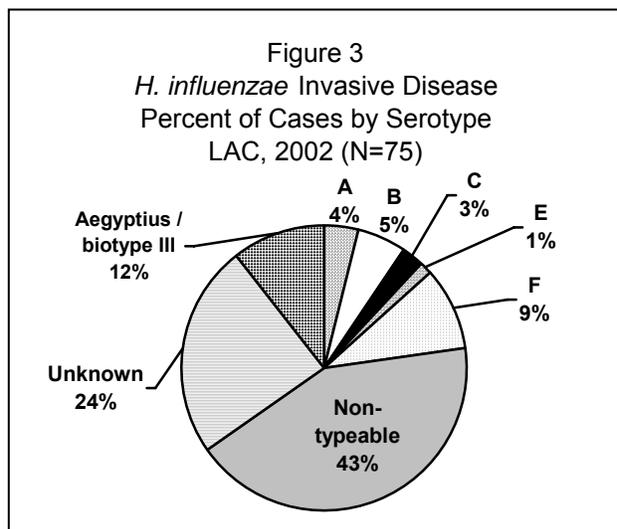
- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

### STRATIFIED DATA

**Seasonality:** A bimodal temporal pattern has been evidenced in the US, with a peak in cases from September through December and a second peak between March and May. However, 50% of Hib cases in LAC occurred in February and March, while the other half of the cases occurred in the summer months. Non-Hib cases in 2002 seemed to follow an unusual pattern in comparison to previous years, with case counts starting at a 57% low in January and steadily increasing into the mid-summer (Figure 4).

**Sex:** The male-to-female ratio of non-Hib and Hib cases was 1:0.9 and 1:1, respectively.

**Age:** The number of cases by age follows the trend of previous years—the 65+ age group remaining the most affected by non-Hib invasive disease over the last six years (Figure 5). Half of non-Hib cases in 2002 were individuals older than 35 years (n=27, 51%), with 59% of these cases identified as a non-typeable serotype. Three of the 4 Hib cases were under 7 years of age and the fourth case was 70 years old. Of the 18 cases with unknown serotype, 14 (77%) were over the age of 30 and were not actively investigated for serotype as detailed in LAC's priority investigation criteria.





**Race/Ethnicity:** In cases where the race/ethnicity was known, the majority of Hib and non-Hib cases were reported among Latinos (n=2, n=13, respectively) followed by Whites among the non-Hib cases (n=13) and Asians (n=2) among the Hib cases (Figure 6.)

**Location:** Half of the Hib cases resided in SPA 8, with the other 2 cases residing in SPA 3 and 4. Seventy percent of the Non-Hib cases resided in 4 SPAs: San Fernando (SPA 2), San Gabriel (SPA 3), Metro (SPA 4), and East (SPA 7). Twenty-three percent of Non-Hib cases resided in West (SPA 5), South (SPA 6), and South Bay (SPA 8). Seven percent of cases did not have a residence indicated.

### COMMENTS

The only cases of *H. influenzae* investigated in LAC are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.

Rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available. None of the cases were in infants too young to have been immunized or in children with medical conditions, which might predispose them to Hib disease.

**Case Fatalities:** There were five fatalities among *H. influenzae* cases: one case was typed as serotype B, one as serotype A, one as Aegyptius biotype III, and the last two were of unknown serotype. Four cases had sepsis and one case had an unspecified complication. Three fatalities were among children younger than 15 years, and males accounted for four of the total case fatalities. Three of the fatalities were Latino, one was Asian, and one was Black.

### ADDITIONAL RESOURCES

Information about immunization is available through the National Immunization Program at: [www.cdc.gov/nip](http://www.cdc.gov/nip) and the Immunization Action Coalition at: [www.immunize.org](http://www.immunize.org)

Information specific to LAC is available from the LAC DHS Immunization Program at: [www.lapublichealth.org/ip](http://www.lapublichealth.org/ip) and the LAC DHS Acute Communicable Disease Control Unit at: [www.lapublichealth.org/acd/procs/b73/b73index.htm](http://www.lapublichealth.org/acd/procs/b73/b73index.htm)

Figure 5  
*H. influenzae* Invasive Disease  
Serotype Non-b Cases by Age Group  
LAC, 2002 (N=53)

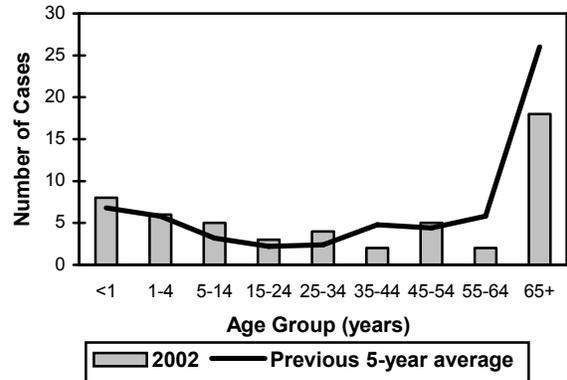


Figure 6  
*H. influenzae* Invasive Disease  
Percent Cases by Race/Ethnicity  
LAC, 2002

