HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	42
Annual Incidence[a]	
LA County	0.44
California[b]	0.24
United States[b]	0.84
Age at Diagnosis	
Mean	49
Median	48
Range	23–78 years

[a]Cases per 100,000 population
[b]Calculated from: CDC. *Notice to Readers:* Final 2016 Reports of Nationally Notifiable Infectious Diseases and Conditions *Weekly* / January 6, 2018 / 65(52). Available at: https://www.cdc.gov/mmwr/volumes/65/wr/mm6552md.htm?s_cid=mm6552md_w

DESCRIPTION

Hepatitis B is a DNA virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or bodily fluids. This is often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the US and should be considered in persons without traditional risk factors.

Symptoms occur in less than half of those acutely infected and begin an average of 90 days (range: 60–150 days) after exposure. They can include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with hepatitis B virus (HBV) are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer occurs in an estimated 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

A comprehensive strategy to eliminate hepatitis B virus transmission was recommended in 1991. It includes prenatal testing of pregnant women for HBsAg to identify newborns who require immunoprophylaxis and to identify household contacts who should be vaccinated, routine vaccination of infants, vaccination of adolescents, and vaccination of adults at high risk for infection.

Adult vaccination is recommended for high risk groups including: men who have sex with men (MSM), those with history of multiple sex partners, injection drug users, persons seeking treatment for sexually transmitted diseases, household and sex contacts of persons with chronic HBV infections, healthcare workers, persons with chronic liver disease, persons with HIV, hemodialysis patients, and unvaccinated adults with diabetes mellitus 19-59 years old.

For the purpose of surveillance, LAC DPH uses the 2012 Centers for Disease Control and Prevention (CDC) Council of State and Territorial Epidemiologists (CSTE) case definition for acute hepatitis B. The criteria include:

1) Discrete onset of symptoms,
2) Jaundice or elevated alanine aminotransferase (ALT) levels >100 IU/L, and
3) HBsAg positive and anti-HBc IgM positive, (if done).

In 2012, the CDC CSTE modified the acute hepatitis B case definition to include documented seroconversion cases (documented negative HBV test result within six months prior to HBV diagnosis) without the acute clinical presentation.

2016 TRENDS AND HIGHLIGHTS

- The 2016 incidence rate decreased from the previous year (0.4 per 100,000 versus 0.5 per 100,000) (Figure 1).
- The incidence rate was highest among those between 45–54 years old (1.0 per 100,000) (Figure 2).

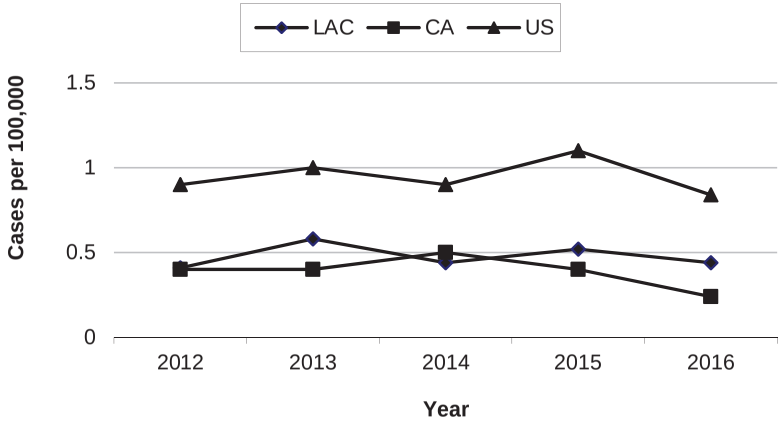
- The male-to-female ratio was 3.2:1.0.
- The incidence rate in 2016 was highest in Whites (0.7 per 100,000) (Figure 3).
- A total of five SPAs had incidence rates greater than the overall county rate of 0.4 per 100,000: SPA 5 (0.6 per 100,000) and SPA's 2, 4, 5, 7 and 8 (0.5 per 100,000) (Figure 4).
- In 2016, risk factors were identified in 69% (n=29) of the 42 confirmed cases including some cases with multiple risk factors. Of those with identified risk factors, the most frequently reported risk factor was having multiple sexual partners (n=12, 40%). This was also the most reported risk factor in 2015. The next frequently reported risk factor in 2016 was patients who had dental procedures done (n=10, 34%) followed by receiving intravenous or intramuscular injections or having a medical procedure (n=10, 34%), MSM (n=8, 33% of males), and incarceration (n=4, 14%).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA LAC, 2012-2016

	2012 (N=38)			2013 (N=55)			2014 (N=42)			2015 (N=50)			2016 (N=42)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	1	26.3	0.4	20	36.4	0.7	5	11.9	0.2	10	20.0	0.4	6	14.3	0.2
35-44	1	34.2	1.0	15	27.3	1.1	16	38.1	1.2	14	28.0	1.1	9	21.4	0.7
45-54	1	26.3	0.8	12	21.8	0.9	14	33.3	1.1	18	36.0	1.4	13	30.9	1.0
55-64	3	7.9	0.3	5	9.1	0.5	3	7.1	0.3	5	10.0	0.5	8	19.0	0.7
65+	2	5.3	0.2	3	5.5	0.3	4	9.5	0.4	3	6.0	0.3	6	14.3	0.5
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race / Ethnicity															
Asian	1	2.6	0.1	6	10.9	0.4	3	7.1	0.2	5	10.0	0.4	4	9.5	0.3
Black	5	13.2	0.6	12	21.8	1.5	6	14.3	0.8	9	18.0	1.1	5	11.9	0.6
Hispanic	1	34.2	0.3	21	38.2	0.5	20	47.6	0.4	17	34.0	0.4	13	30.9	0.3
White	1	36.8	0.5	15	27.3	0.6	10	23.8	0.4	17	34.0	0.6	19	45.2	0.7
Other	0	-	-	0	-	-	1	2.4	-	0	-	-	0	-	-
Unknown	5	13.2	-	1	1.8	-	2	4.8	-	2	4.0	-	1	2.4	-
SPA															
1	2	5.3	0.5	1	1.8	0.3	2	4.8	0.5	2	4.0	0.5	1	2.4	0.3
2	5	13.2	0.2	9	16.4	0.4	12	28.6	0.5	14	28.0	0.6	12	28.6	0.5
3	8	21.1	0.5	9	16.4	0.6	1	2.4	0.1	6	12.0	0.4	6	14.3	0.4
4	9	23.7	0.8	9	16.4	0.8	11	26.2	1.0	6	12.0	0.5	6	14.3	0.5
5	3	7.9	0.5	7	12.7	1.1	1	2.4	0.2	1	2.0	0.2	4	9.5	0.6
6	2	5.3	0.2	10	18.2	1.0	6	14.3	0.6	7	14.0	0.7	1	2.4	0.1
7	6	15.8	0.5	6	10.9	0.5	6	14.3	0.5	8	16.0	0.6	7	16.7	0.5
8	3	7.9	0.3	2	3.6	0.2	3	7.1	0.3	6	12.0	0.5	5	11.9	0.5
Unknown	0	-	-	2	3.6	-	0	-	-	0	-	-	-	-	-

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 2012-2016**



* Rates based on fewer than 19 cases are unreliable

**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2012-2016**

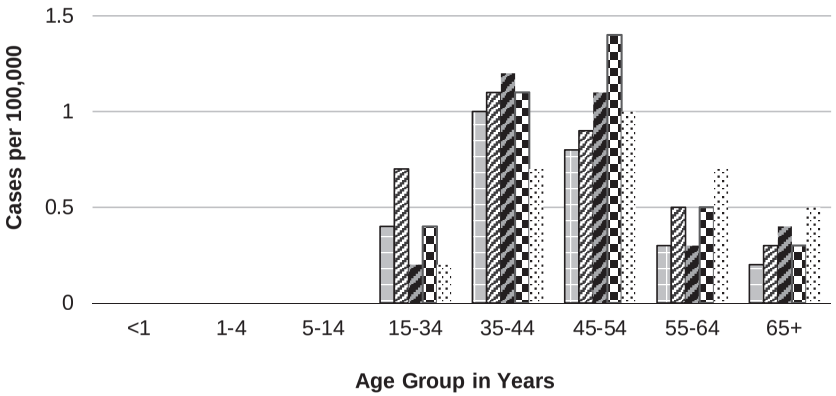
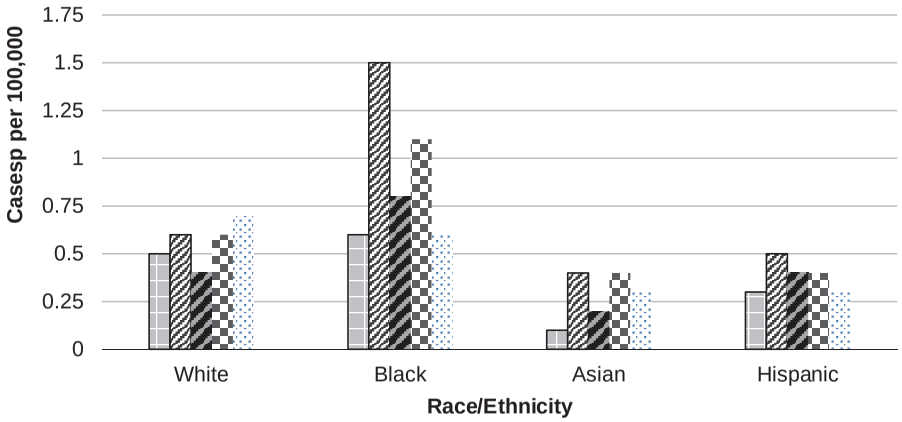
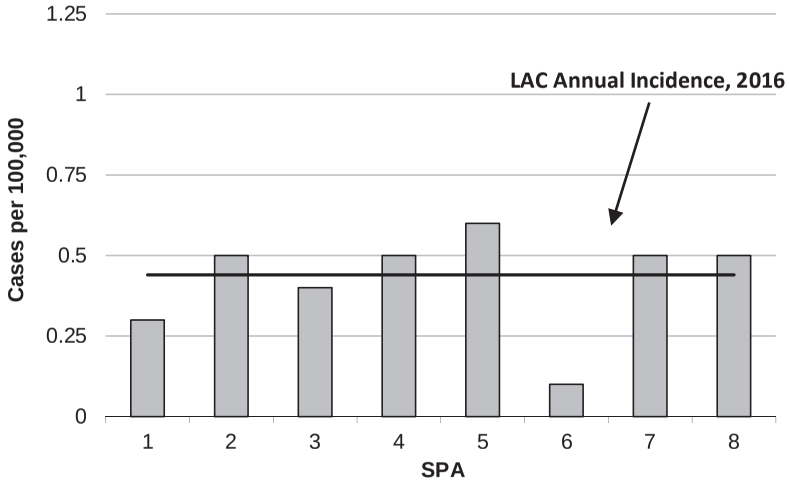


**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2012-2016**



* Rates bases on fewer than 19 cases are unreliable

**Figure 4. Incidence Rates* of Hepatitis B by SPA
LAC, 2016 (N=42)**



* Rates based on fewer than 19 cases are unreliable

HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	50
Annual Incidence[a]	
LA County	0.52
California[b]	0.41
United States[b]	1.05
Age at Diagnosis	
Mean	44
Median	43
Range	23–84 years

[a]Cases per 100,000 population
[b]Calculated from: CDC. *Notice to Readers:* Final 2015 Reports of Nationally Notifiable Infectious Diseases and Conditions *Weekly* / November 25, 2016 / 65(46);1306–1321. Available at: www.cdc.gov/mmwr/volumes/65/wr/mm6546a9.htm

DESCRIPTION

Hepatitis B is a DNA virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or bodily fluids. This is often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the US and should be considered in persons without traditional risk factors.

Symptoms occur in less than half of those acutely infected and begin an average of 90 days (range 60–150 days) after exposure. They can include: fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with hepatitis B virus (HBV) are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer occurs in an estimated 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

The absence of acute hepatitis B in persons under 19 years old in the US is evidence of the successful immunization strategy to eliminate HBV transmission. This strategy includes: screening all pregnant women and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children <19 years old.

Adult vaccination is recommended for high risk groups including: men who have sex with men (MSM), those with history of multiple sex partners, injection drug users, persons seeking treatment for sexually transmitted diseases, household and sex contacts of persons with chronic HBV infections, healthcare workers, persons with chronic liver disease, persons with HIV, hemodialysis patients, and unvaccinated adults with diabetes mellitus 19-59 years old.

For the purpose of surveillance, LAC DPH uses the 2012 CDC Council of State and Territorial Epidemiologists (CSTE) case definition for acute hepatitis B. The criteria include:

1) Discrete onset of symptoms,
2) Jaundice or elevated alanine aminotransferase (ALT) levels >100 IU/L, and
3) HBsAg positive and anti-HBc IgM positive, (if done).

In 2012, the CDC CSTE modified the acute hepatitis B case definition to include documented seroconversion cases (documented negative HBV test result within six months prior to HBV diagnosis) without the acute clinical presentation.

2015 TRENDS AND HIGHLIGHTS

- The 2015 incidence rate slightly increased from the previous year (0.5 per 100,000 versus 0.4 per 100,000) (Figure 1).
- The incidence rate was highest among those between 45–54 years old (1.4 per 100,000) (Figure 2).
- The male-to-female ratio was 39:11.
- Similar to the previous year, Blacks had the highest incidence rate in 2015 (1.1 per 100,000) (Figure 3).
- Three SPAs had incidence rates greater than the overall county rate of 0.5 per 100,000: SPA 2 (0.6 per 100,000), SPA 6 (0.7 per 100,000), and SPA 7 (0.6 per 100,000) (Figure 4).
- Risk factors were identified in 50% (n=25) of the 50 confirmed cases (including some cases with multiple risk factors). Of those with identified risk factors, the most frequently reported risk factor was unprotected sexual contact (n=10,

40%). Half of these cases reported having multiple sexual partners (n=5, 20%) followed by patients who had dental procedures done in a non-healthcare facility outside of the country (n=2, 8%), IV drug use (n=1, 4%), consumption of raw shellfish (n=1, 4%), and source of infection could not be determined (n=5, 20%).

- In September, ACDC investigated a breach in infection control in an acute care facility dialysis unit after being notified by the facility's infection preventionist (IP) that an HIV-infected patient had a documented HBV seroconversion following the dialysis of a known chronically infected HBV patient. The investigation revealed that a technician had not performed the recommended bleaching procedure between the two patients as well as the subsequent five patients that had used the same dialysis machine. The IP immediately initiated infection prevention measures and ensured that the dialysis machine was not used further until adequate disinfection was completed. The six exposed patients were screened for HBV IgM and HBV through polymerase chain reaction (PCR). ACDC did not identify any additional HBV cases related to this breach. The five subsequent patients that were potentially exposed showed no evidence of HBV infection in follow-up testing.

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA LAC, 2011-2015

	2011 (N=60)			2012 (N=38)			2013 (N=55)			2014 (N=42)			2015 (N=50)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	12	20.0	0.4	10	26.3	0.4	20	36.4	0.7	5	11.9	0.2	10	20.0	0.4
35-44	10	16.7	0.7	13	34.2	1.0	15	27.3	1.1	16	38.1	1.2	14	28.0	1.1
45-54	21	35.0	1.6	10	26.3	0.8	12	21.8	0.9	14	33.3	1.1	18	36.0	1.4
55-64	12	20.0	1.2	3	7.9	0.3	5	9.1	0.5	3	7.1	0.3	5	10.0	0.5
65+	5	8.3	0.5	2	5.3	0.2	3	5.5	0.3	4	9.5	0.4	3	6.0	0.3
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race/Ethnicity															
Asian	3	5.0	0.2	1	2.6	0.1	6	10.9	0.4	3	7.1	0.2	5	10.0	0.4
Black	13	21.7	1.5	5	13.2	0.6	12	21.8	1.5	6	14.3	0.8	9	18.0	1.1
Hispanic	19	31.7	0.4	13	34.2	0.3	21	38.2	0.5	20	47.6	0.4	17	34.0	0.4
White	23	38.3	0.8	14	36.8	0.5	15	27.3	0.6	10	23.8	0.4	17	34.0	0.6
Other	0	-	-	0	-	-	0	-	-	1	2.4	-	0	-	-
Unknown	2	3.3	-	5	13.2	-	1	1.8	-	2	4.8	-	2	4.0	-
SPA															
1	0	-	-	2	5.3	0.5	1	1.8	0.3	2	4.8	0.5	2	4.0	0.5
2	13	21.7	0.6	5	13.2	0.2	9	16.4	0.4	12	28.6	0.5	14	28.0	0.6
3	8	13.3	0.5	8	21.1	0.5	9	16.4	0.6	1	2.4	0.1	6	12.0	0.4
4	15	25.0	1.2	9	23.7	0.8	9	16.4	0.8	11	26.2	1.0	6	12.0	0.5
5	1	1.7	0.2	3	7.9	0.5	7	12.7	1.1	1	2.4	0.2	1	2.0	0.2
6	10	16.7	0.9	2	5.3	0.2	10	18.2	1.0	6	14.3	0.6	7	14.0	0.7
7	3	5.0	0.2	6	15.8	0.5	6	10.9	0.5	6	14.3	0.5	8	16.0	0.6
8	8	13.3	0.7	3	7.9	0.3	2	3.6	0.2	3	7.1	0.3	6	12.0	0.5
Unknown	2	3.3	-	0	-	-	2	3.6	-	0	-	-	0	-	-

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

**Figure 1. Incidences Rates* of Acute Hepatitis B
LAC, CA, and US, 2010-2015**

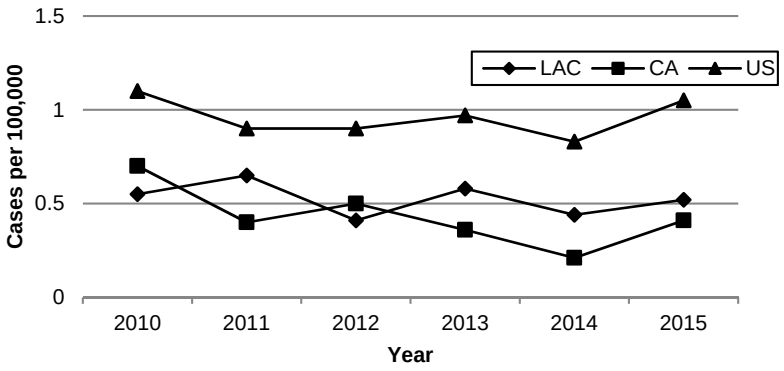


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2012-2015**

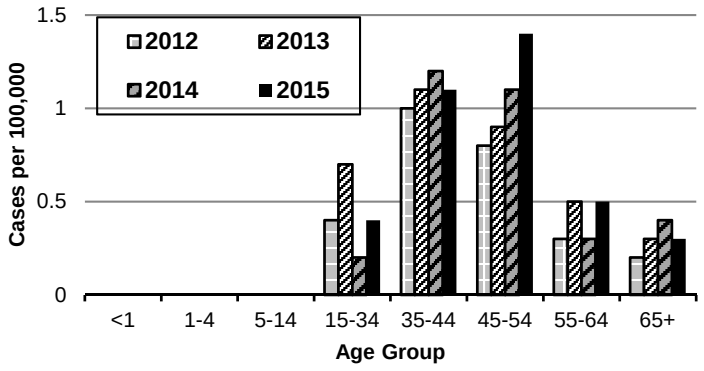


**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2012-2015**

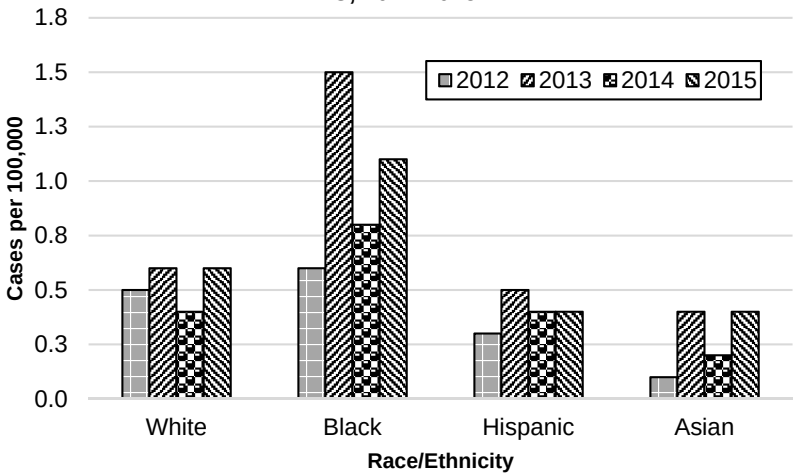
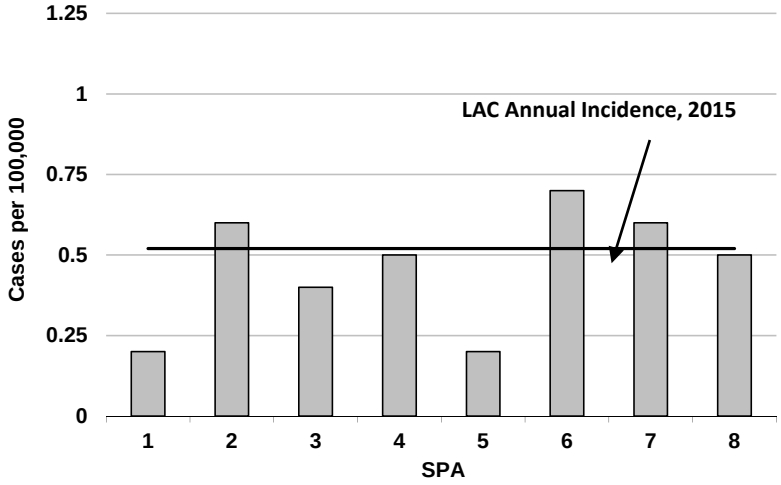


**Figure 4. Incidence Rates* of Hepatitis B by SPA
LAC, 2015 (N=50)**



*Rates based on fewer than 19 cases are unreliable

HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	42
Annual Incidence[a]	
LA County	0.44
California[b]	0.29
United States[b]	0.93
Age at Diagnosis	
Mean	46
Median	44
Range	22–73 years

[a]Cases per 100,000 population.
[b]Calculated from Final 2014 Reports of Nationally Notifiable Infectious Diseases. MMWR 64(36):1019–1033.

DESCRIPTION

Hepatitis B is a DNA-virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or body fluids, most often through injection drug use, sexual contact with an infected person, or transmission from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the US; identifying and investigating healthcare associated cases is important to detect outbreaks and implement measures to prevent further cases.

Symptoms, which occur in less than half of those acutely infected, begin an average of 90 days (range: 60-150 days) after exposure and can include: fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with hepatitis B virus (HBV) are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15-25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

The absence of acute hepatitis B in persons under the age of 19 years in the US is evidence of the successful immunization strategy to eliminate HBV transmission. This strategy includes: screening all pregnant women and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years.

Adult vaccination is recommended for those in high risk groups including men who have sex with men (MSM), persons with a history of multiple sex partners, injection drug users, persons seeking treatment for sexually transmitted disease; household and sex contacts of persons with chronic HBV infection, healthcare workers, persons with chronic liver disease, persons with HIV, hemodialysis patients and unvaccinated adults with diabetes mellitus aged 19 through 59.

For the purpose of surveillance, the LAC DPH uses the 2012 CDC/Council of State and Territorial Epidemiologists (CSTE) criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms, and 2) jaundice *or* elevated aminotransferase (ALT) levels >100 IU/L, and 3) HBsAg positive and anti-HBc IgM positive, (if done). In 2012, the CDC/CSTE modified the acute hepatitis B case definition to include documented seroconversion cases (documented negative HBV test result within 6 months prior to HBV diagnosis) without the acute clinical presentation.

2014 TRENDS AND HIGHLIGHTS

- The 2014 incidence rate decreased from the previous year (0.44 per 100,000 versus 0.58 per 100,000) (Figure 1).
- Similar to the previous two years, the 2014 incidence rate was highest in persons between the ages of 35-44 years old (1.2 per 100,000, Figure 2).
- The male-to-female ratio was 2.2:1.
- Blacks had the highest incidence rate in 2014 (0.8 per 100,000) which is consistent with previous years (Figure 3).
- Five Service Planning Areas (SPA) had rates greater than the overall county mean rate of 0.44 per 100,000)—SPA 4 (1.0 per 100,000), SPA 6 (0.6 per 100,000), SPA 1 (0.5 per 100,000), SPA 2 (0.5 per 100,000) and SPA 7 (0.5 per 100,000) (Figure 4).
- Risk factors were identified in 67% (n=28) of the 42 confirmed cases (including some cases with multiple risk factors). The most frequently reported risk factor was having multiple sexual partners (n=15, 54%) (Figure 5).
- Two healthcare associated investigations were completed in 2014. During March 2014, two residents of a subacute care facility were reported to ACDC with acute Hepatitis B infection. The investigation identified four acute, two chronic and three resolving cases in the facility. Genotyping of available viruses revealed that four acute cases and one chronic case shared an identical genotype. This finding supported that person-to-person spread or

transmission through one or more common medical procedures had occurred within the facility. ACDC was not able to implicate a definite source of Hepatitis B transmission for this outbreak. For more information about this investigation, see the Special Report section.

- In September 2014, ACDC was notified of a breach in infection control following a hemodialysis session of a patient recently diagnosed with chronic hepatitis B virus (HBV) infection. After inadequate disinfection, the same dialysis machine was used on three consecutive patients without completing a bleaching procedure between patients during dialysis sessions. ACDC conducted an investigation and, although ACDC did not identify additional cases of chronic or newly diagnosed cases of HBV, the ACDC investigation team identified a number of faulty administrative and infection control practices that contributed to this infection control breach and made several recommendation to prevent similar breaches in the future.

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2010-2014

	2010 (N=54)			2011 (N=60)			2012 (N=38)			2013 (N=55)			2014 (N=42)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	18	33.3	0.6	12	20.0	0.4	10	26.3	0.4	20	36.3	0.7	5	11.9	0.2
35-44	13	24.1	1.0	10	16.7	0.8	13	34.2	1.0	15	27.3	1.1	16	38.1	1.2
45-54	11	20.4	0.9	21	35.0	1.6	10	26.3	0.8	12	21.8	0.9	14	33.3	1.1
55-64	7	13.0	0.7	12	20.0	1.2	3	7.9	0.3	5	9.1	0.5	3	7.2	0.3
65+	5	9.2	0.5	5	8.3	0.5	2	5.3	0.2	3	5.4	0.3	4	9.5	0.4
Unknown	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Race/Ethnicity															
Asian	11	20.4	0.8	3	5.0	0.2	1	2.6	0.1	6	10.9	0.4	3	7.1	0.2
Black	14	25.9	1.8	13	21.7	1.7	5	13.2	0.6	12	21.8	1.5	6	14.3	0.8
Hispanic	14	25.9	0.3	19	31.7	0.4	13	34.2	0.3	21	38.2	0.5	20	47.6	0.4
White	14	25.9	0.5	23	38.3	0.9	14	36.8	0.5	15	27.3	0.6	10	23.8	0.4
Other	1	1.8	-	0	-	-	0	-	-	0	-	-	1	2.4	-
Unknown	0	-	-	2	3.3	-	5	13.2	-	1	1.8	-	2	4.8	-
SPA															
1	2	3.7	0.5	0	0	0.0	2	5.3	0.5	1	1.8	0.3	2	4.8	0.5
2	5	9.3	0.2	13	21.7	0.6	5	13.2	0.2	9	16.4	0.4	12	28.5	0.5
3	10	18.5	0.6	8	13.3	0.5	8	21.0	0.5	9	16.4	0.6	1	2.4	0.1
4	8	14.8	0.7	15	25.0	1.3	9	23.7	0.8	9	16.4	0.8	11	26.2	1.0
5	4	7.4	0.6	1	1.7	0.2	3	7.9	0.5	7	12.7	1.1	1	2.4	0.2
6	8	14.8	0.8	10	16.7	1.0	2	5.3	0.2	10	18.1	1.0	6	14.3	0.6
7	7	13.0	0.5	3	5.0	0.2	6	15.8	0.5	6	10.9	0.5	6	14.3	0.5
8	10	18.5	0.9	8	13.3	0.8	3	7.9	0.3	2	3.6	0.2	3	7.1	0.3
Unknown	0	-	-	2	3.3	-	0	-	-	2	3.6	-	0	-	-

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

**Figure 1. Incidence Rate of Acute Hepatitis B
LAC, CA and US, 2010-2014**

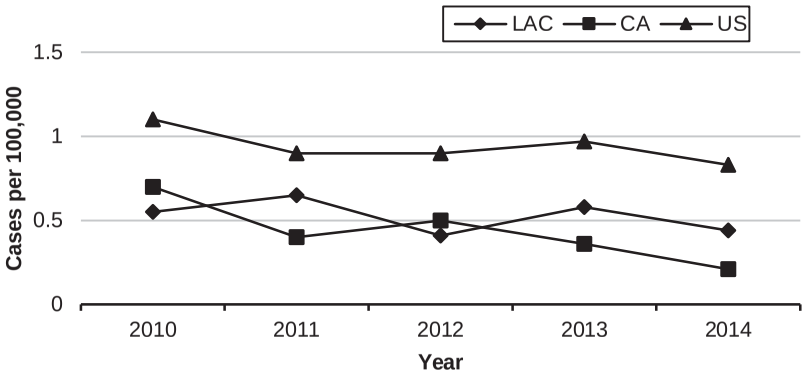
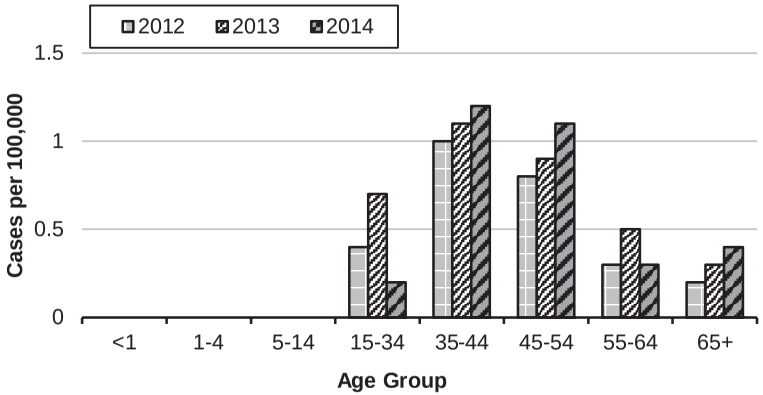
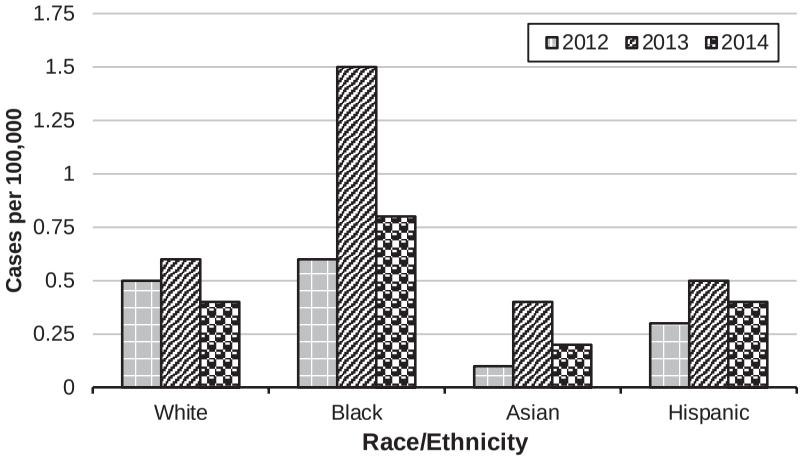


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2012-2014**



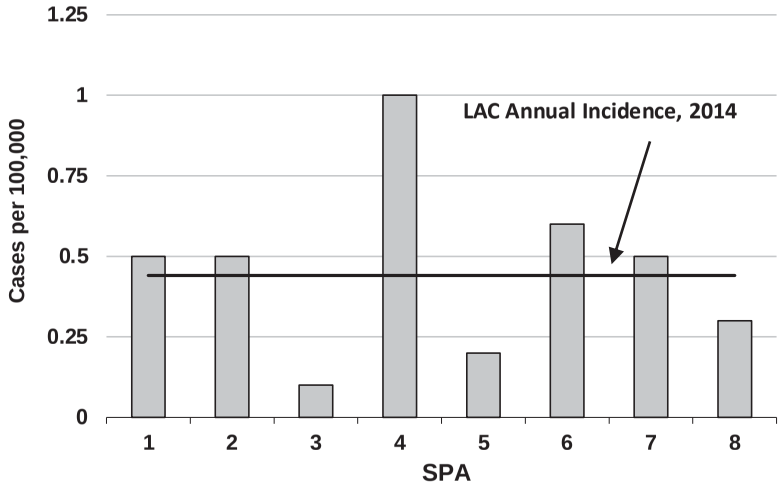
* Rates based on fewer than 19 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2012-2014**



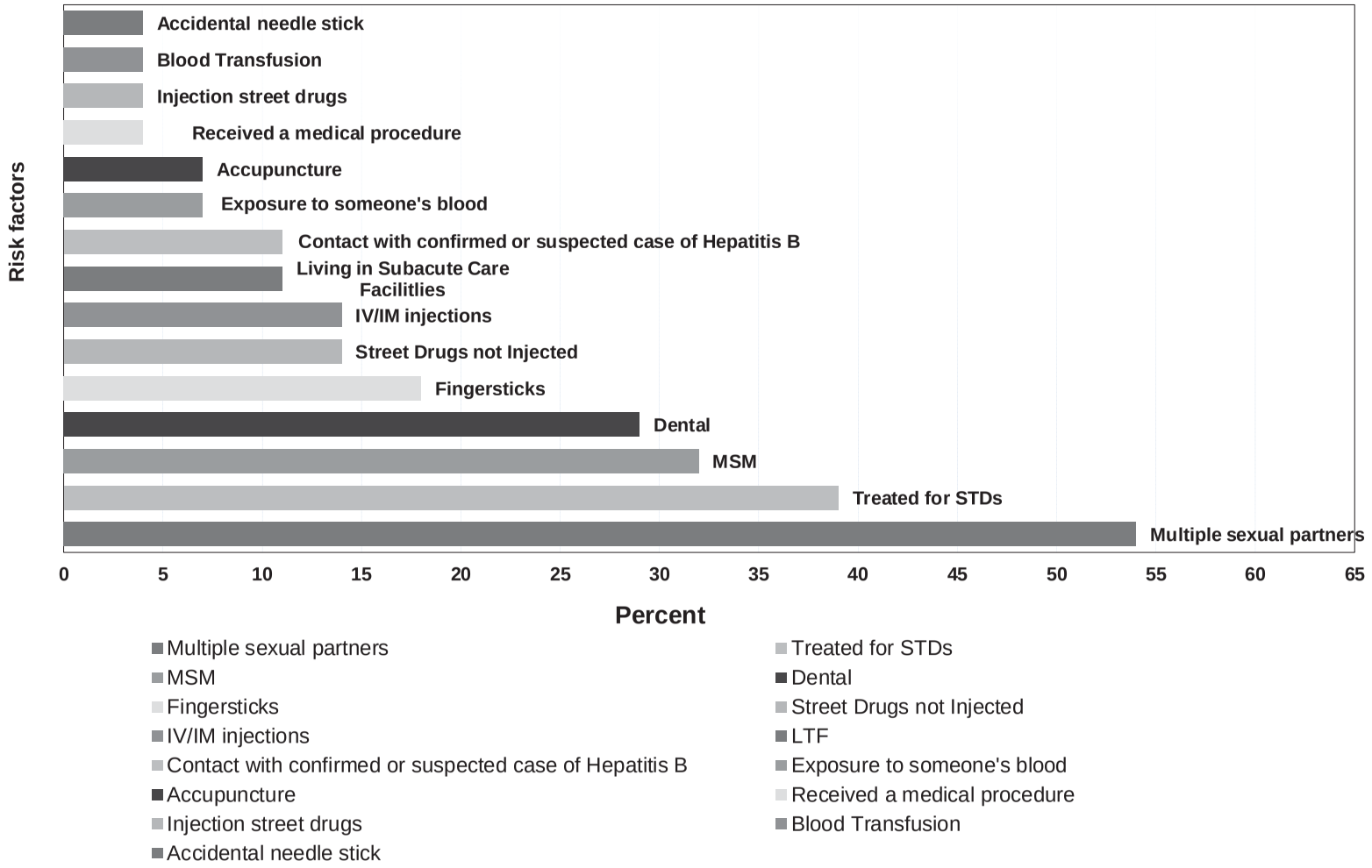
* Rates based on fewer than 19 cases are unreliable

**Figure 4. Incidence Rates* of Hepatitis B by SPA
LAC, 2014 (N=42)**



* Rates based on fewer than 19 cases are unreliable

Figure 5. Hepatitis B Reported Risk Factors*
LAC, 2014 (n=28)



*Includes cases with multiple risk factors

HEPATITIS B, PERINATAL

CRUDE DATA	
HBsAg+ Mothers	938
Maternal Age at Diagnosis	36 years
Infants Born to HBsAg+ Mothers	967
Incidence of Exposure[a]	7.1
HBsAg+ Infant[b]	1
Infant Age at Diagnosis	10 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2014.
[b]Based on number of infants that had post vaccine serology testing.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). A woman can transmit the HBV to her infant during pregnancy and from exposure to cervical secretions and blood during delivery. In LAC, it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis (PEP) with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a three-dose vaccine series, has demonstrated 85%-95% effectiveness in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Efficacy is enhanced if administered within 12 hours of birth. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing PEP to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Unit (PHBPU) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure to the HBsAg-positive mother for greater than one year (often limited to nuclear family).

2014 TRENDS AND HIGHLIGHTS

- The incidence of exposure increased by 6% from 6.7 to 7.1 per 1000 infants born in 2014 compared to 2013. The increase is due to increased compliance with testing and reporting (Figure 1).
- Sixty-three percent of women screened for HBsAg were 15-34 years of age (Table 1).
- Eighty-seven percent (n=819) of HBsAg+ women were born outside of the US.
- Eighty-six percent of HBsAg+ women were Asian followed by 5.5% Hispanic, 2.9% black, 2.9% white, 1.9% other and 0.5% unknown (Figures 2 and 3).
- Approximately sixty-eight percent of the HBsAg+ women reside in Service Planning Area (SPA) 3, which has a large Asian population (Figure 4).
- Ninety-five percent of infants received the first dose of Hepatitis B vaccine and HBIG within 12 hours of birth (Figure 5).

- Nearly nine percent (n=83) of infants born to HBsAg+ women received post-vaccination serology (PVS) testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. Infants born in the later part of 2014 are too young for PVS testing. One infant was HBsAg+, indicating infection (Figure 6).

Table 1: Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA Los Angeles County, 2010-2014

	2010 (N=653)			2011 (N=700)			2012 (N=854)			2013 (N=891)			2014 (N=938)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
1-4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
5-14	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
15-34	448	68.6	15.2	476	68	16.1	589	69.0	20.0	544	61.1	19.2	590	62.9	20.9
35-44	204	31.2	14.2	219	31.3	15.2	263	31.0	18.3	339	38.0	25.4	309	32.9	23.4
45-54	0	-	-	2	0.3	0.1	1	0.1	0.1	8	0.9	0.6	5	0.5	0.4
55-64	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
65+	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-
Unknown	1	0.2	-	3	0.4	-	1	0.1	-	0	-	-	34	3.6	-
Race/Ethnicity															
Asian	491	75.2	37.4	555	79.3	42.3	678	79.0	51.7	712	79.9	52.7	809	86.2	59.6
Black	22	3.4	2.6	25	3.6	2.9	30	4.0	3.5	33	3.6	4.1	27	2.9	3.4
Hispanic	50	7.7	1.1	55	7.9	1.2	46	5.0	1.0	44	4.9	1.0	52	5.5	1.1
White	38	5.8	1.3	33	4.7	1.2	41	5.0	1.4	24	2.7	0.9	27	2.9	1.0
Other	19	2.9	40.4	13	1.9	34.9	20	2.3	82.4	28	2.7	15.5	18	1.9	-
Unknown	33	5.1	-	19	2.7	-	39	5.0	-	51	5.7	-	5	0.5	-
SPA															
1	9	1.4	2.4	10	1.4	2.7	15	1.8	4.0	8	0.9	2.0	12	1.3	3.1
2	85	13	3.8	78	11.1	3.5	93	10.9	4.2	76	8.5	3.5	83	8.8	3.8
3	329	50.4	19.0	369	52.7	21.3	491	57.5	28.3	580	65.1	35.5	642	68.4	39.1
4	83	12.7	6.6	74	10.6	5.9	82	9.6	6.5	64	7.2	5.6	60	6.4	5.2
5	19	2.9	2.9	30	4.3	4.5	34	4.0	5.2	36	4.0	5.6	35	3.7	5.4
6	19	2.9	1.8	29	4.1	2.7	24	2.8	2.2	19	2.1	1.8	21	2.2	2.0
7	42	6.4	3.0	46	6.6	3.3	34	4.0	2.5	47	5.3	3.6	39	4.2	3.0
8	58	8.9	5.2	47	6.7	4.2	69	8.1	6.1	60	6.7	5.6	42	4.5	3.9
Unknown	9	1.4	-	17	2.4	-	12	1.4	-	1	0.1	-	4	0.4	-

*Rates calculated based on less than 19 cases or events are considered unreliable. **Other includes Pacific Islanders.

Figure 1. Perinatal Hepatitis B, Incidence of Exposure
LAC, 2004-2014

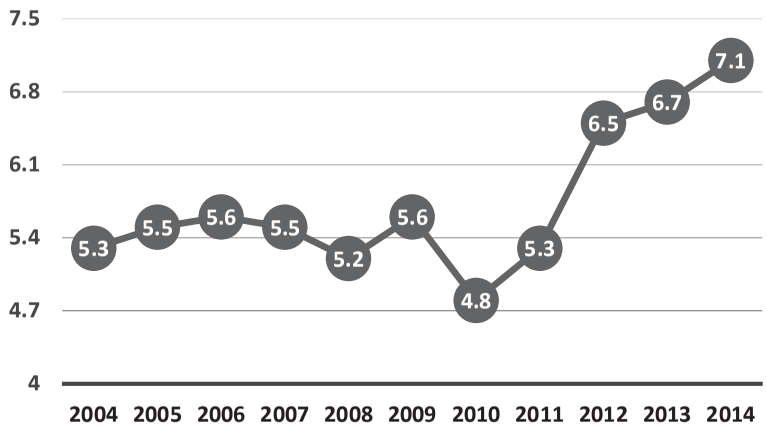
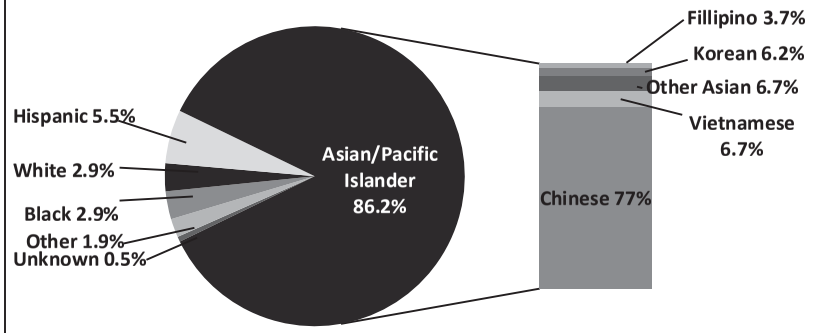


Figure 2. Perinatal Hepatitis B, Maternal Race/Ethnicity
LAC, 2014 (N=938)



Other includes Native-American and any racial group that cannot be categorized as Asian, black, Hispanic, white or unknown. Other Asian is Japanese, Asian-Indian, Cambodian non-Hmong, Thai, Lao or unknown Asian. Percentages may not add up to 100 due to rounding.

Figure 3. Perinatal Hepatitis B, Maternal Race/Ethnicity
LAC, 2010-2014

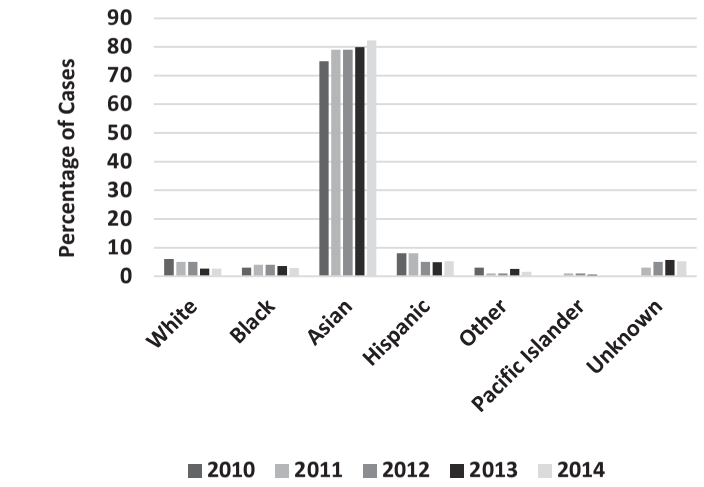


Figure 4. Perinatal Hepatitis B, Maternal HBsAg+ by SPA
LAC, 2014 (N=938)

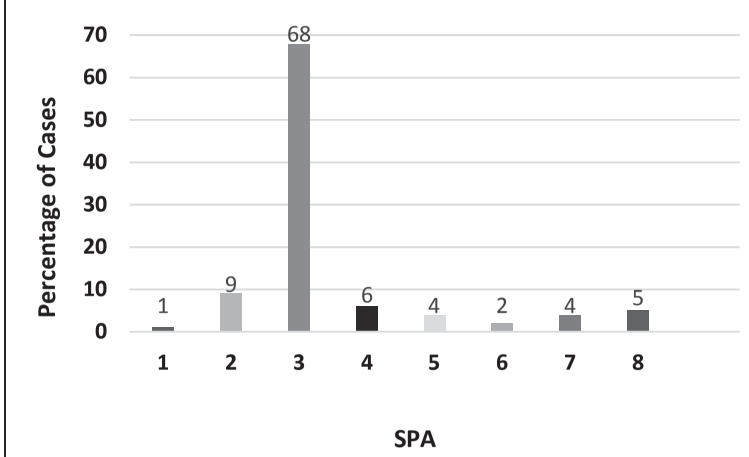
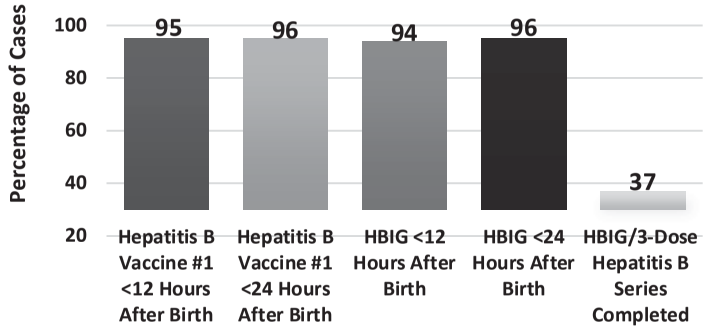
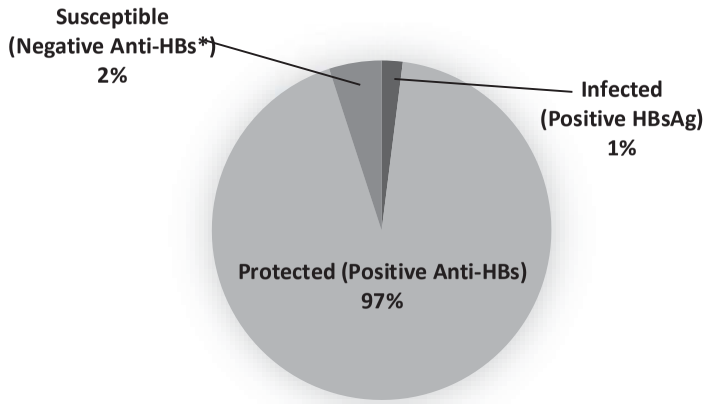


Figure 5. Perinatal Hepatitis B, Infant Hepatitis B Immunoprophylaxis LAC, 2014 (N=967)



Note: As of the date of this report, many infants born in the later part of 2014 are not due to receive the 3rd dose hepatitis B vaccine.

Figure 6. Perinatal Hepatitis B, Infant Post Vaccination Serology (PVS) Results LAC, 2014 (N=105)



*Antibody to Hepatitis B Surface Antigen
Note: As of the date of this report, many infants born in the later part of 2014 are not eligible for PVS testing which is recommended at 9-18 months of age after completion of at least 3 doses of hepatitis B vaccine.

HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	55
Annual Incidence[a]	
LA County	0.58
California[b]	0.36
United States[b]	0.97
Age at Diagnosis	
Mean	42
Median	42
Range	19-77 years

[a]Cases per 100,000 population

[b]Calculated from Final 2013 Reports of Nationally Notifiable Infectious Diseases. MMWR 63(32):702-716.

DESCRIPTION

Hepatitis B is a DNA-virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or body fluids, most often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the United States (US) and should be considered in persons without traditional risk factors.

Symptoms, which occur in less than half of those acutely infected, begin an average of 90 days (range: 60–150 days) after exposure and can include: fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with hepatitis B virus (HBV) are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

The absence of acute hepatitis B in persons under age 19 in the US is evidence of the successful immunization strategy to eliminate HBV transmission. This strategy includes: screening all pregnant women and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years.

Adult vaccination is recommended for those in high risk groups including; men who have sex with men (MSM), history of multiple sex partners, injection drug users, persons seeking treatment for sexually transmitted disease; household and sex contacts of persons with chronic HBV infections, healthcare workers, persons with chronic liver disease, persons with HIV, hemodialysis patients and unvaccinated adults with diabetes mellitus aged 19 through 59.

For the purpose of surveillance, Los Angeles County (LAC) Department of Public Health uses the 2012 Centers for Disease Control and Prevention (CDC)/Council of State and Territorial Epidemiologists (CSTE) criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase (ALT) levels >100 IU/L, and 3) HBsAg positive and anti-HBc IgM positive, (if done). In 2012, the CDC/CSTE modified the acute hepatitis B case definition to include documented seroconversion cases (documented negative HBV test result within 6 months prior to HBV diagnosis) without the acute clinical presentation.

2013 TRENDS AND HIGHLIGHTS

- One 2013 acute hepatitis B case was a documented seroconversion and the remainder of the cases met the 2012 CDC/CSTE acute Hepatitis B case criteria.
- The 2013 incidence rate increased from the previous year (0.58 per 100,000 versus 0.51 per 100,000) (Figure 1).
- As in 2012, the 2013 incidence rate (1.1 per 100,000) was highest in persons between the ages of 35-44 years (Figure 2).
- The male-to-female ratio was 1:0.38.
- Blacks had the highest incidence rate in 2013 (1.5 per 100,000) which is consistent with previous years (Figure 3).
- Four Service Planning Areas (SPA) had rates greater than the overall county mean rate of 0.58 per 100,000)—SPA 5 (1.1 per 100,000), SPA 6 (1.0 per 100,000), SPA 4 (0.8 per 100,000), and SPA 3 (0.6 per 100,000) (Figure 4).
- Risk factors were identified in 75% (n=41) of the 55 confirmed cases (including some cases with multiple risk factors). Of those with identified risk factors, the most frequently reported risk factor was MSM (n=15, 42% of males), followed by having multiple sexual partners (n=17, 41%), non-injection street drugs (n=7, 17%), IV/IM injections (n=6, 15%), dental work (n=4, 10%), IVDU (n=4, 10%), fingersticks (n=3, 7%), having a diagnostic medical

procedure (n=3, 7%), tattoo (2 at commercial shop, 1 other) (n=3, 7%), accidental exposure to blood (n=3, 7%), acupuncture (n=2, 5%), accidental needle stick (n=2, 5%), incarceration (n=2, 5%), contact with a confirmed or suspected case of hepatitis B (n=1, 3%),hemodialysis (n=1, 2%) and LTF (n=1, 2%) (Figure 5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2009-2013

	2009 (N=41)			2010 (N=54)			2011 (N=60)			2012 (N=38)			2013 (N=55)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
15-34	12	29.3	0.4	18	33.3	0.6	12	20.0	0.4	10	26.3	0.4	20	36.3	0.7
35-44	7	17.1	0.5	13	24.1	1.0	10	16.7	0.8	13	34.2	1.0	15	27.3	1.1
45-54	16	39.0	1.3	11	20.4	0.9	21	35.0	1.6	10	26.3	0.8	12	21.8	0.9
55-64	4	9.7	0.4	7	13.0	0.7	12	20.0	1.2	3	7.9	0.3	5	9.1	0.5
65+	2	4.9	0.2	5	9.2	0.5	5	8.3	0.5	2	5.3	0.2	3	5.4	0.3
Unknown	0	0		0	0		0	0		0			0	0	
Race/Ethnicity															
Asian	5	12.2	0.4	11	20.4	0.8	3	5.0	0.2	1	2.6	0.1	6	10.9	0.4
Black	11	26.8	1.4	14	25.9	1.8	13	21.7	1.7	5	13.2	0.6	12	21.8	1.5
Hispanic	12	29.3	0.3	14	25.9	0.3	19	31.7	0.4	13	34.2	0.3	21	38.2	0.5
White	11	26.8	0.4	14	25.9	0.5	23	38.3	0.9	14	36.8	0.5	15	27.3	0.6
Other	0	0		1	1.8		0	0		0	0		0	0	0
Unknown	2	4.9		0	0		2	3.3		5	13.2		1	1.8	
SPA															
1	0	0	0	2	3.7	0.5	0	0	0.0	2	5.3	0.5	1	1.8	0.3
2	4	9.8	0.2	5	9.3	0.2	13	21.7	0.6	5	13.2	0.2	9	16.4	0.4
3	6	14.6	0.4	10	18.5	0.6	8	13.3	0.5	8	21.0	0.5	9	16.4	0.6
4	13	31.7	1.2	8	14.8	0.7	15	25.0	1.3	9	23.7	0.8	9	16.4	0.8
5	1	2.4	0.2	4	7.4	0.6	1	1.7	0.2	3	7.9	0.5	7	12.7	1.1
6	10	24.4	1.0	8	14.8	0.8	10	16.7	1.0	2	5.3	0.2	10	18.1	1.0
7	2	4.9	0.2	7	13.0	0.5	3	5.0	0.2	6	15.8	0.5	6	10.9	0.5
8	4	9.8	0.4	10	18.5	0.9	8	13.3	0.8	3	7.9	0.3	2	3.6	0.2
Unknown	1	2.4		0	0		2	3.3		0	0		2	3.6	

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 2009-2013**

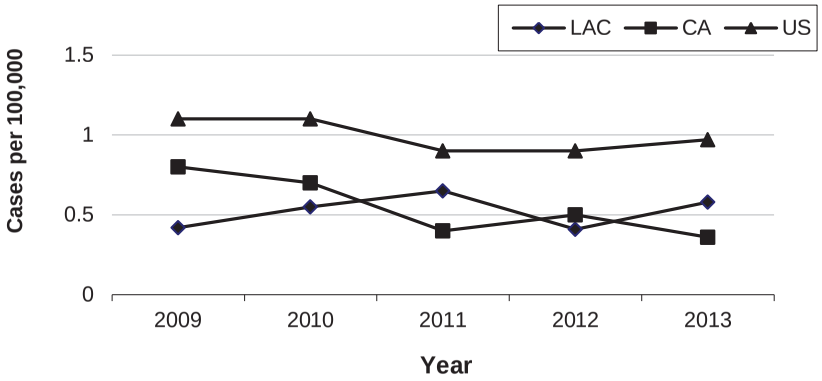
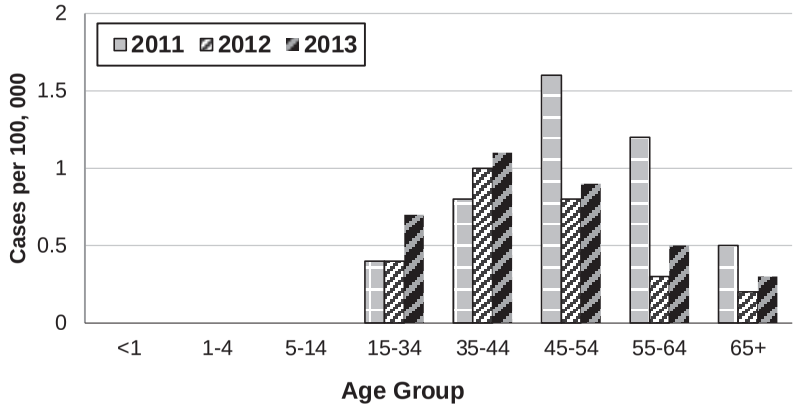
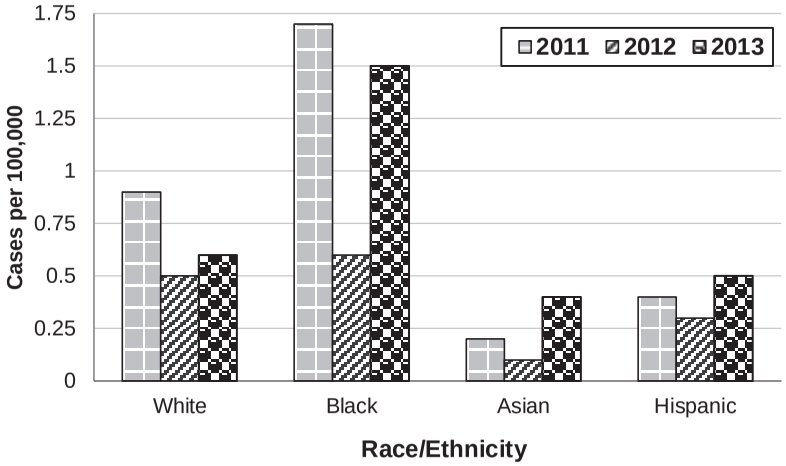


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2011-2013**



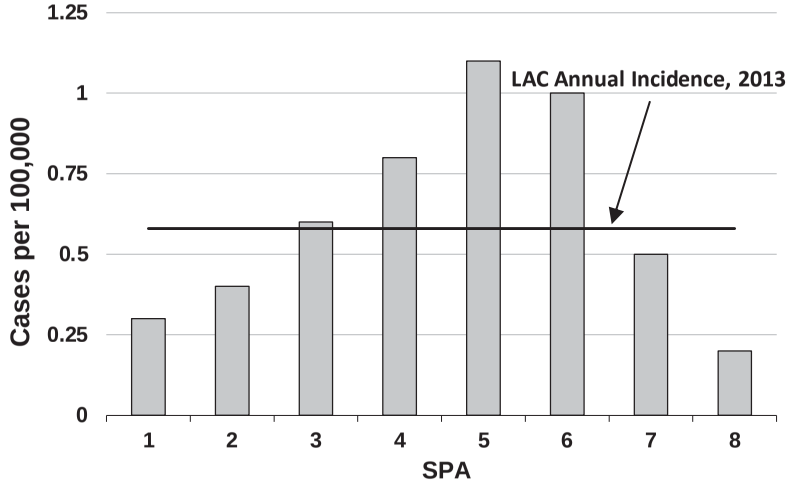
* Rates based on fewer than 19 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2011-2013**



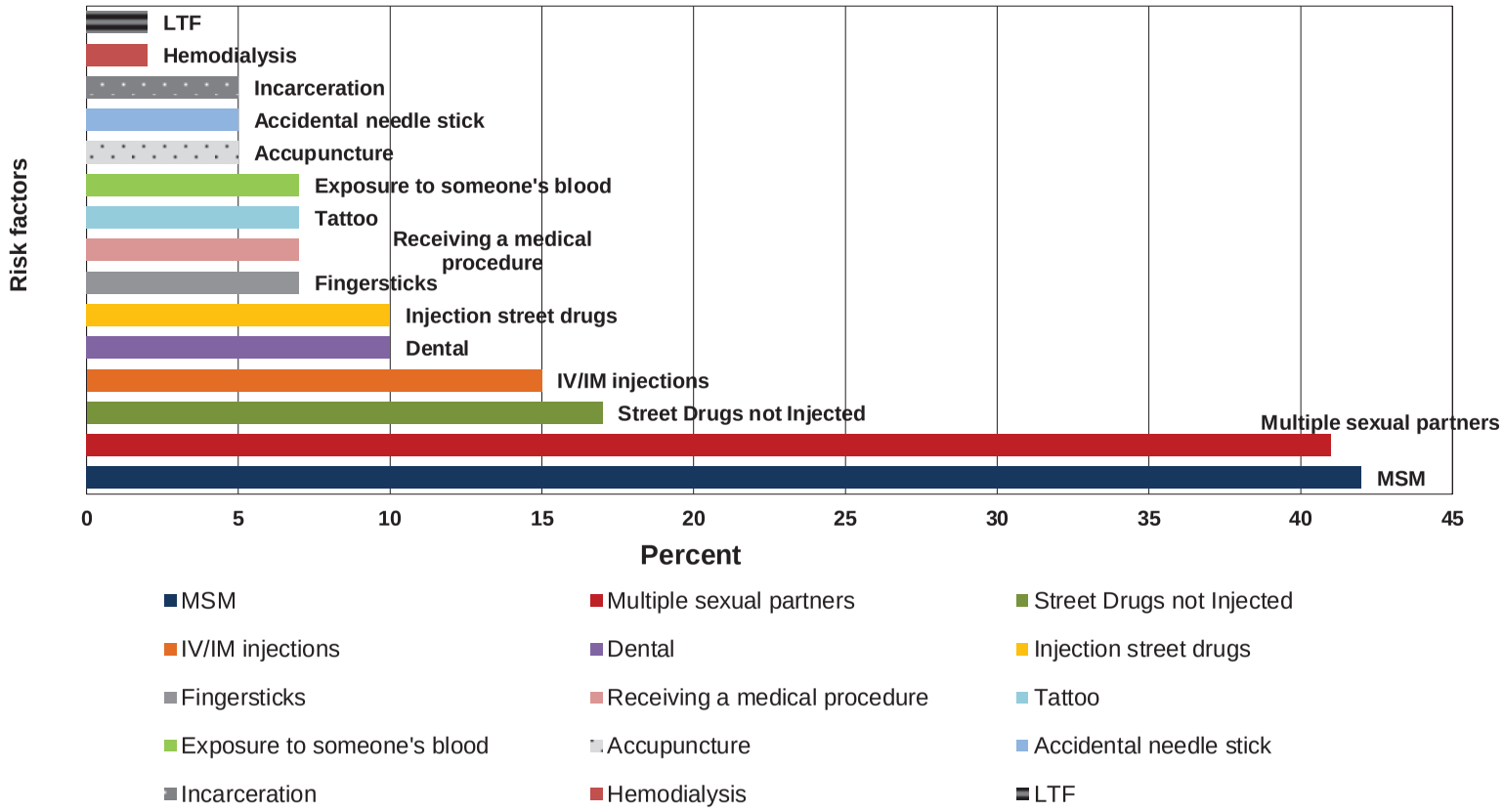
* Rates based on fewer than 19 cases are unreliable

**Figure 4. Incidence Rates* of Hepatitis B by SPA
LAC, 2013 (N=55)**



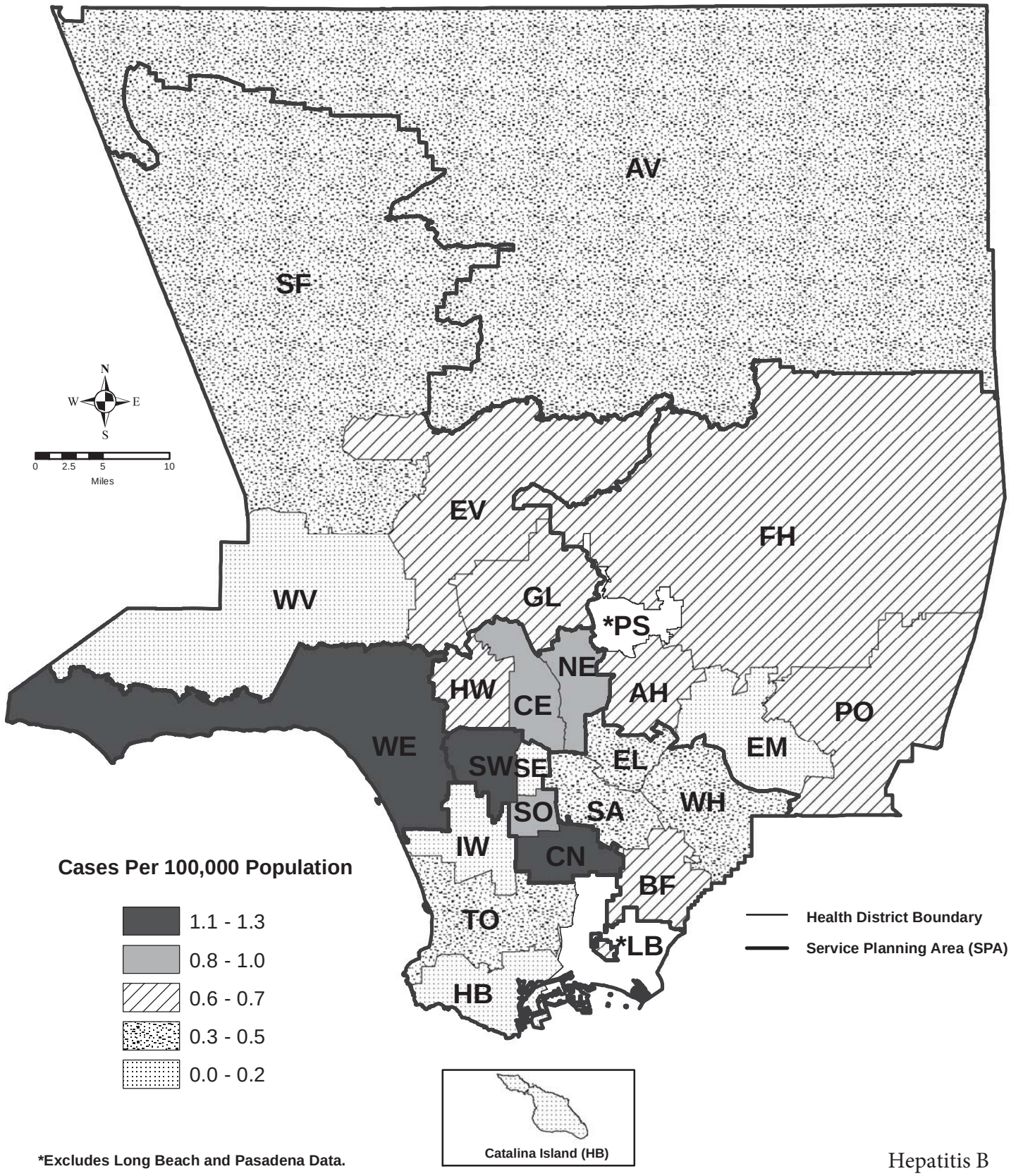
* Rates based on fewer than 19 cases are unreliable

Fig. 5. Hepatitis B Reported Risk Factors*
LAC, 2013 (n=55)



*Includes cases with multiple risk factors

Map 8. Hepatitis B
Rates by Health District, Los Angeles County, 2013*



*Excludes Long Beach and Pasadena Data.

HEPATITIS B, PERINATAL

CRUDE DATA	
Infants Born to HBsAg+ Mothers	915
Incidence of Exposure[a] LA County	6.7
HBsAg+ Infant[b]	1
Maternal Age at Diagnosis	38 years
Infant Age at Diagnosis	9 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2013.
[b]Based on number of infants that had post vaccine serology testing.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). A woman can transmit the HBV to her infant during pregnancy and from exposure to cervical secretions and blood during the birthing process. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women would become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis (PEP) with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a three-dose vaccine series, has demonstrated 85%-95% effectiveness in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. However, efficacy is enhanced if administered within 12 hours of birth. Post-vaccination serologic (PVS) testing is recommended at age 9-18 months after completing PEP to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Unit (PHBPU) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure to the HBsAg-positive mother for greater than one year (often limited to nuclear family).

2013 TRENDS AND HIGHLIGHTS

- Nine hundred and fifteen infants (includes twelve sets of twins) were born to 891 HBsAg+ women.
- The incidence of exposure increased by 3% from 6.5 to 6.7 per 1000 infants born in 2013 compared to 2012 (Figure 1).
- Sixty-one percent (n=544) of women screened for HBsAg were 15-34 years of age (Figure 7).
- Eighty-eight percent (n=782) of HBsAg+ women were born outside of the United States.
- Eighty percent (n=712) of HBsAg+ women were Asian followed by 5% (n=51) unknown, 5% (n=44) Hispanic, 4% (n=32) black, 3% (n= 28) other and 3% (n=24) white (Figures 2 and 3).
- Sixty-five percent (n=580) of the HBsAg+ women reside in Service Planning Area (SPA) 3, which has a large Asian population (Figure 4).
- Ninety-five percent (n=867) of infants received the first dose of Hepatitis B vaccine and HBIG within 12 hours of birth (Figure 5).
- Eleven percent (n=105) of infants born to HBsAg+ women received PVS testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. Infants born in the later part of 2013 are too young for PVS testing. One infant was HBsAg+, indicating infection (Figure 6).
- Among the HHCs, 37% (n=452) were 0-10 years of age and 30% (n=370) were 31-40 years of age (Figure 7).
- Hepatitis B virus marker status of HHCs (n=315) is as follows: Fifty-one percent (n=160) had positive antibodies to HBsAg (anti-HBs), 26% (n=82) were HBsAg negative, 6% (n=18) were susceptible (anti-HBs negative), 15% (n=46) were infected (HBsAg+) and 2% (n=9) had positive hepatitis B core antibodies, which indicates a previous or ongoing infection. The PHBPU recommends the Hepatitis B vaccine series for those who are susceptible (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2009-2013

	2009 (N=760)			2010 (N=653)			2011 (N=700)			2012 (N=854)			2013 (N=891)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00	0	0.0	0.00
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00	0	0.0	0.00
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00	0	0.0	0.00
15-34	520	58.4	18.4	448	68.6	15.2	476	68	16.1	589	69.0	20	544	61.1	19.2
35-44	237	31.2	10.7	204	31.2	14.2	219	31.3	15.2	263	31.0	18.3	339	38.0	25.4
45-54	3	0.4	0.2	0	0	0	2	0.3	0.1	1	0.1	0.1	8	0.9	0.6
55-64	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%
65+	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	0	0.0		1	0.2		3	0.4		1	0.1		0	0.0	--
Race/Ethnicity															
Asian	570	75.0	43.8	491	75.2	37.4	555	79.3	42.3	678	79.0	51.7	712	79.9	52.7
Black	33	4.0	3.9	22	3.4	2.6	25	3.6	2.9	30	4.0	3.5	32	3.6	4.1
Hispanic	76	10.0	1.6	50	7.7	1.1	55	7.9	1.2	46	5.0	1.0	44	4.9	1
White	40	5.0	1.4	38	5.8	1.3	33	4.7	1.2	41	5.0	1.4	24	2.7	0.9
*Other	41	5.0	1.6	19	2.9	40.4	13	1.9	34.9	20	2.3	82.4	28	3.1	155
Unknown	0	0.0		33	5.1		19	2.7		39	5.0		51	5.7	--
SPA															
1	6	0.8	1.6	9	1.4	2.4	10	1.4	2.7	15	1.8	4.0	8	0.9	2.0
2	117	15.4	5.3	85	13	3.8	78	11.1	3.5	93	10.9	4.2	76	8.5	3.5
3	355	46.7	20.5	329	50.4	19.0	369	52.7	21.3	491	57.5	28.3	580	65.1	35.5
4	83	10.9	6.7	83	12.7	6.6	74	10.6	5.9	82	9.6	6.5	64	7.2	5.6
5	32	4.2	4.9	19	2.9	2.9	30	4.3	4.5	34	4.0	5.2	36	4.0	5.6
6	38	5.0	3.6	19	2.9	1.8	29	4.1	2.7	24	2.8	2.2	19	2.1	1.8
7	50	6.6	3.6	42	6.4	3.0	46	6.6	3.3	34	4.0	2.5	47	5.3	3.6
8	75	9.9	6.7	58	8.9	5.2	47	6.7	4.2	69	8.1	6.1	60	6.7	5.6
Unknown	4	0.5		9	1.4		17	2.4		12	1.4		1	0.1	--

*Rates calculated based on less than 19 cases or events are considered unreliable * Other includes Pacific Islanders.

**Figure 1. Perinatal Hepatitis B Incidence of Exposure
LAC, 2003-2013**

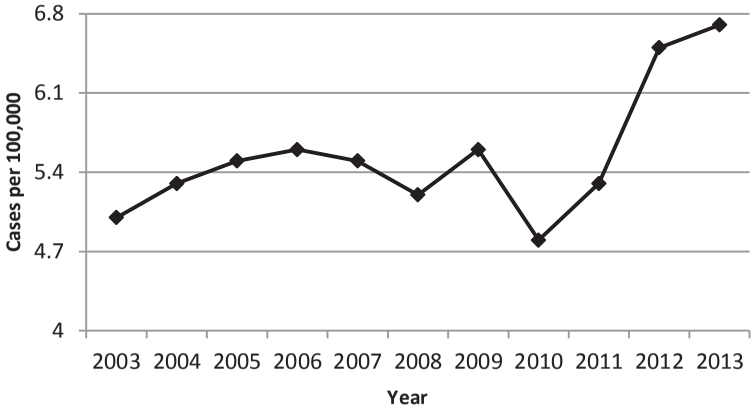
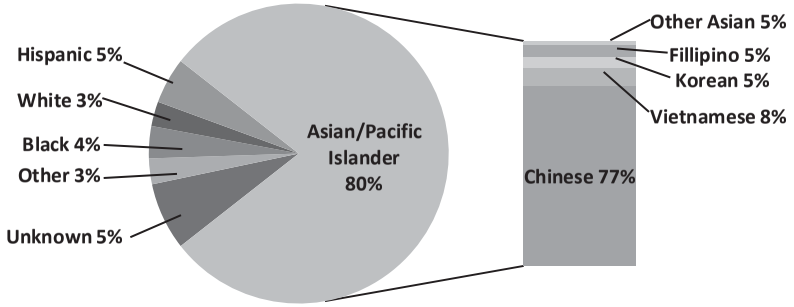


**Figure 2. Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2013 (N=891)**



Other includes Native-American and any racial group that cannot be categorized as Asian, Black, Hispanic, White or unknown. Other Asian is Japanese, Asian-Indian, Cambodian non-Hmong, Thai, Lao or unknown Asian.

**Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2009-2013 (N= 3858)**

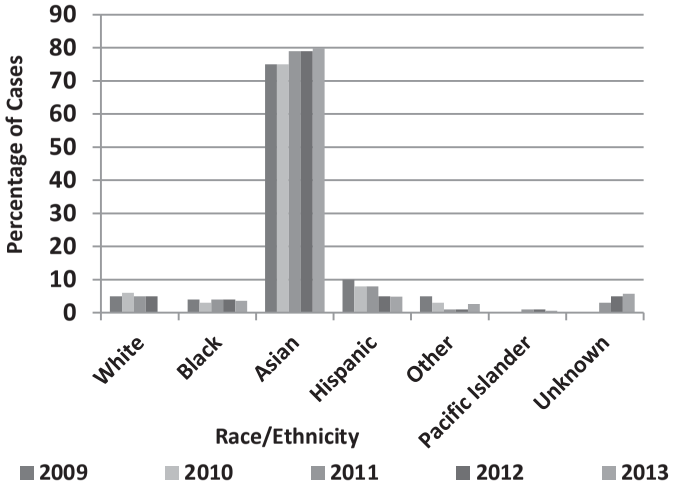


**Figure 4. Perinatal Hepatitis B Maternal by SPA
LAC, 2013 (N=891)**

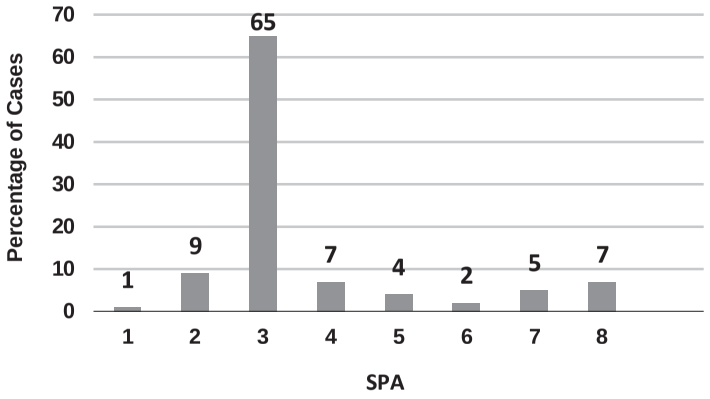
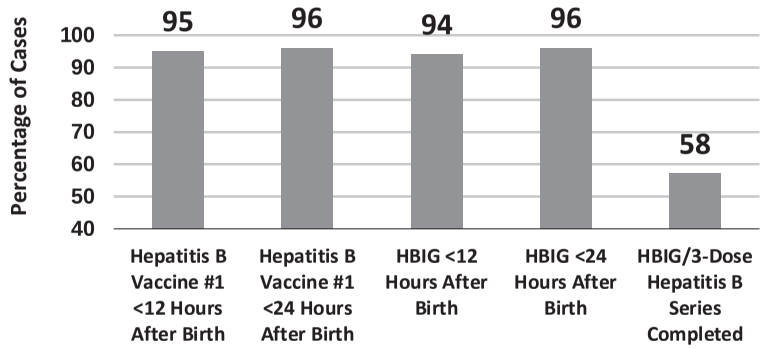
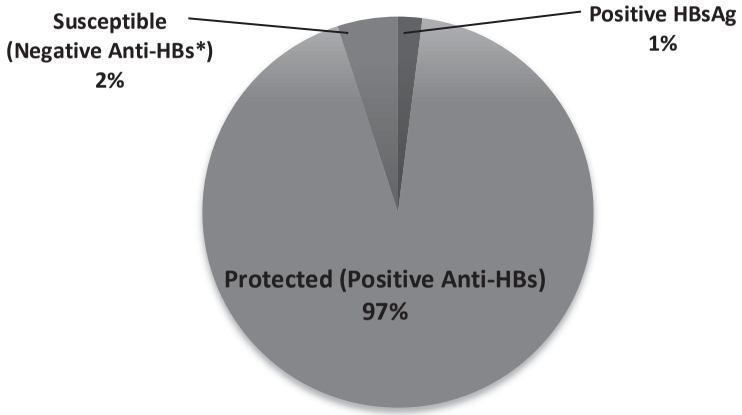


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2013 (N=915)



Note: As of the date of this report, many infants born in the later part of 2012 are not due to receive the 3rd dose hepatitis B vaccine.

Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology (PVS) Results LAC, 2013 (N=105)



*Antibody to Hepatitis B Surface Antigen
Note: As of the date of this report, many infants born in the later part of 2013 are not eligible for PVS testing which is recommended at 9-18 months of age after completion of at least 3 doses of hepatitis B vaccine.

Figure 7. Perinatal Hepatitis B Household & Sexual Contacts Age Range, LAC, 2013 (N=1232)

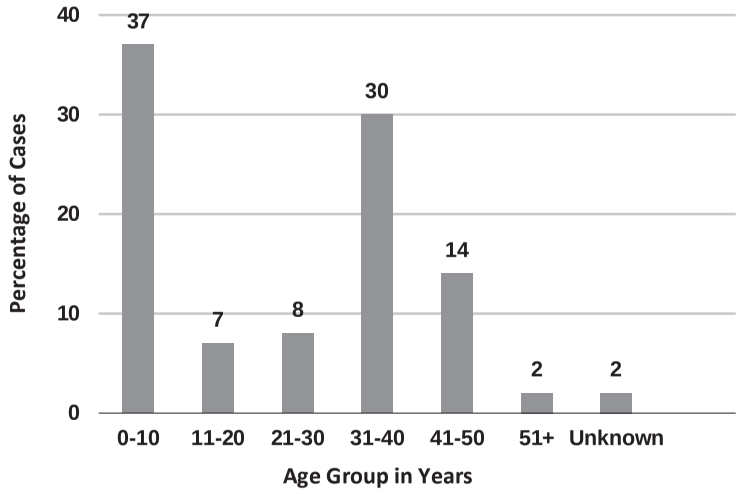
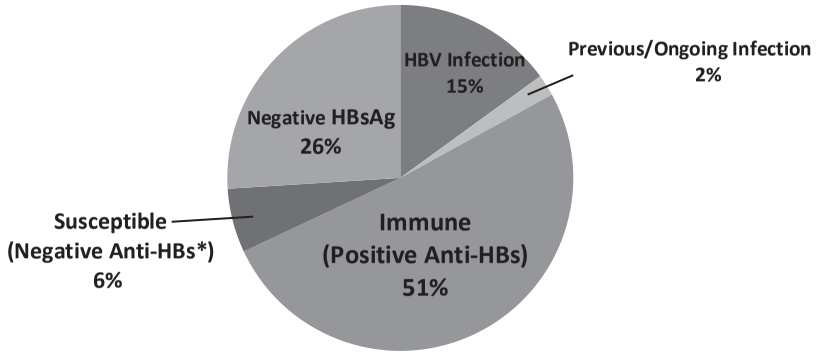


Figure 8. Hepatitis B Status of Household Contacts LAC, 2013 (N=315)



*Antibody to Hepatitis B Surface Antigen

HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	38
Annual Incidence[a]	
LA County	0.41
California[b]	0.4
United States[b]	0.9
Age at Diagnosis	
Mean	43
Median	39
Range	26-68 years

[a]Cases per 100,000 population
[b]Calculated from Final 2012 Reports of Nationally Notifiable Infectious Disease. MMWR 62(33);669-682.

DESCRIPTION

Hepatitis B is a DNA-virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or body fluids, most often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the United States (US) and should be considered in persons without traditional risk factors.

Symptoms, which occur in less than half of those acutely infected, begin an average of 90 days (range: 60–150 days) after exposure and can include: fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with hepatitis B virus (HBV) are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

The absence of acute hepatitis B in persons under age 19 in the US is evidence of the successful immunization strategy to eliminate HBV transmission. This strategy includes: screening all pregnant women and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years.

Adult vaccination is recommended for those in high risk groups including; men who have sex with men (MSM), history of multiple sex partners, injection drug users, persons seeking treatment for sexually transmitted disease; household and sex contacts of persons with chronic HBV infections, healthcare workers, persons with chronic liver disease, persons with HIV, hemodialysis patients and unvaccinated adults with diabetes mellitus aged 19 through 59.

For the purpose of surveillance, Los Angeles County (LAC) Department of Public Health uses the 2012 Centers for Disease Control and Prevention (CDC)/Council of State and Territorial Epidemiologists (CSTE) criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase (ALT) levels >100 IU/L, and 3) HBsAg positive and anti-HBc IgM positive, (if done). In 2012, the CDC/CSTE modified the acute hepatitis B case definition to include documented seroconversion cases (documented negative HBV test result within 6 months prior to HBV diagnosis) without the acute clinical presentation.

2012 TRENDS AND HIGHLIGHTS

- One acute hepatitis B case was a documented seroconversion and the remainder of the cases met the 2012 CDC/CSTE acute Hepatitis B case criteria.
- The 2012 incidence rate decreased from the previous year (0.41 per 100,000 versus 0.65 per 100,000) (Figure 1).
- The incidence rate was highest in persons between the ages of 35-44 years (1.0 per 100,000) (Figure 2).
- The male-to-female ratio was 1:0.4.
- As in 2011, blacks had the highest incidence rate in 2012 (0.6 per 100,000) compared to other race/ethnicities (Figure 3).
- Five Service Planning Areas (SPA) had rates greater than the overall county mean rate of 0.41 per 100,000)—SPA 4 (0.8 per 100,000), SPA 1 (0.5 per 100,000), SPA 3 (0.5 per 100,000), SPA 5 (0.5 per 100,000), and SPA 7 (0.5 per 100,000) (Figure 4).
- A risk factor interview was conducted for 89% (n=34) of the confirmed cases. Of the cases interviewed, 100% reported at least one risk factor. The most frequently reported risk factor was having multiple sexual partners (n=14, 37%) followed by MSM (n=8, 30% of males), incarceration (n=6, 16%), non-injection street drugs (n=6, 16%), dental work (n=6, 16%), IV/IM

injections (n=6, 16%), fingersticks (n=5, 13%), having a diagnostic medical procedure (n=5, 16%), tattoo (n=4, 11%), acupuncture (n=3, 8%), accidental exposure to blood (n=3, 8%), contact with a confirmed or suspected case of hepatitis B (n=1, 3%), hemodialysis (n=1, 3%), accidental needle stick (n=1, 3%), transfusion (n=1, 3%), and IVDU (n=1, 3%) (Figure5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012

	2008 (N=66)			2009 (N=41)			2010 (N=54)			2011 (N=60)			2012 (N=38)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
15-34	18	27.3	0.6	12	29.3	0.4	18	33.3	0.6	12	20.0	0.4	10	26.3	0.4
35-44	14	21.2	0.9	7	17.1	0.5	13	24.1	0.9	10	16.7	0.8	13	34.2	1.0
45-54	13	19.7	1.0	16	39.0	1.2	11	20.4	0.8	21	35.0	1.6	10	26.3	0.8
55-64	14	21.2	1.5	4	9.7	0.4	7	13.0	0.7	12	20.0	1.2	3	7.9	0.3
65+	7	10.6	0.7	2	4.9	0.2	5	9.2	0.5	5	8.3	0.5	2	5.3	0.2
Unknown	0	0		0	0		0	0		0	0		0		
Race/Ethnicity															
Asian	7	10.6	0.5	5	12.2	0.4	11	20.4	0.8	3	5.0	0.2	1	2.6	0.1
Black	15	22.7	1.8	11	26.8	1.3	14	25.9	1.6	13	21.7	1.7	5	13.2	0.6
Hispanic	16	24.2	0.3	12	29.3	0.3	14	25.9	0.3	19	31.7	0.4	13	34.2	0.3
White	22	33.3	0.8	11	26.8	0.4	14	25.9	0.5	23	38.3	0.9	14	36.8	0.5
Other	1	1.5	4.1	0	0		1	1.8		0	0		0	0	
Unknown	5	7.6		2	4.9		0	0		2	3.3		5	13.2	
SPA															
1	2	3.0	0.5	0	0	0	2	3.7	0.5	0	0	0.0	2	5.3	0.5
2	9	13.6	0.4	4	9.8	0.2	5	9.3	0.2	13	21.7	0.6	5	13.2	0.2
3	6	9.1	0.3	6	14.6	0.3	10	18.5	0.6	8	13.3	0.5	8	21.0	0.5
4	7	10.6	0.5	13	31.7	1.0	8	14.8	0.6	15	25.0	1.3	9	23.7	0.8
5	9	13.6	1.4	1	2.4	0.2	4	7.4	0.6	1	1.7	0.2	3	7.9	0.5
6	22	33.3	2.1	10	24.4	1.0	8	14.8	0.7	10	16.7	1.0	2	5.3	0.2
7	6	9.1	0.4	2	4.9	0.1	7	13.0	0.5	3	5.0	0.2	6	15.8	0.5
8	4	6.1	0.4	4	9.8	0.4	10	18.5	0.9	8	13.3	0.8	3	7.9	0.3
Unknown	1	1.5		1	2.4		0	0		2	3.3		0	0	

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 2008-2012**

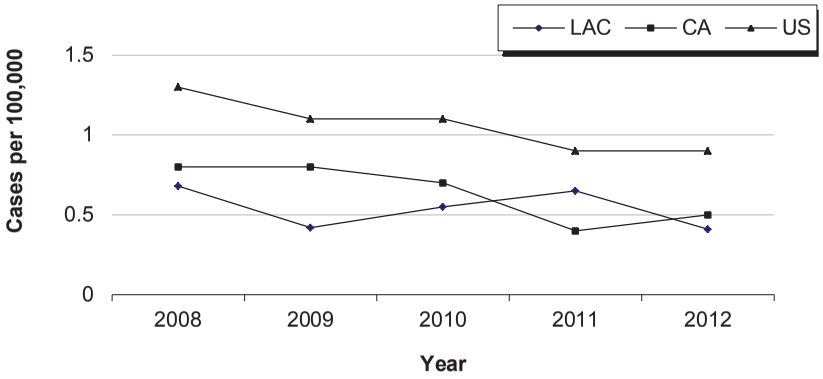
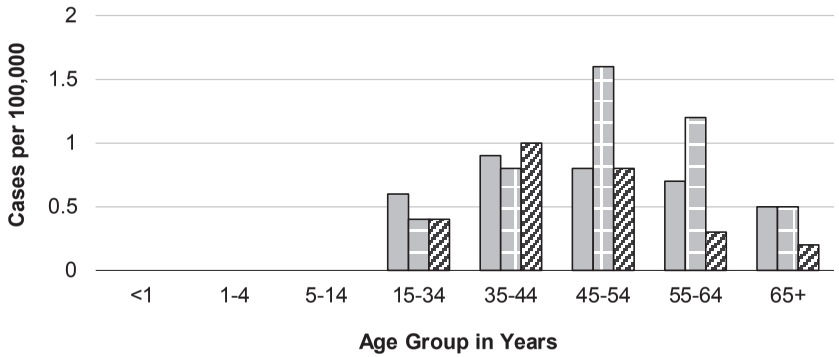
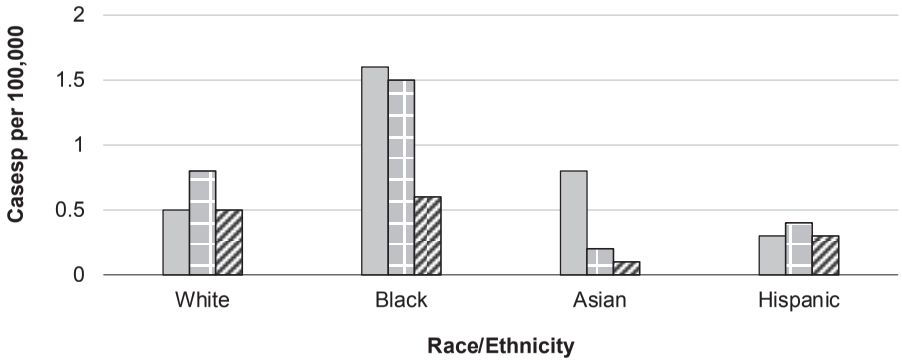


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2010-2012**



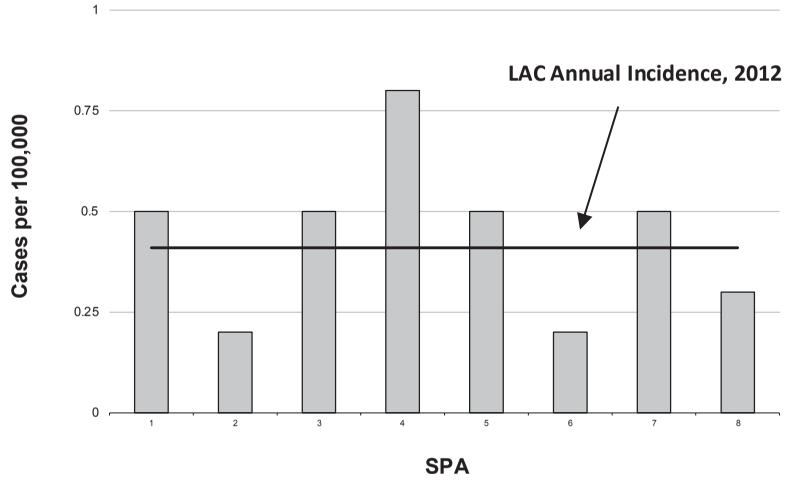
* Rates bases on fewer than 19 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2010-2012**



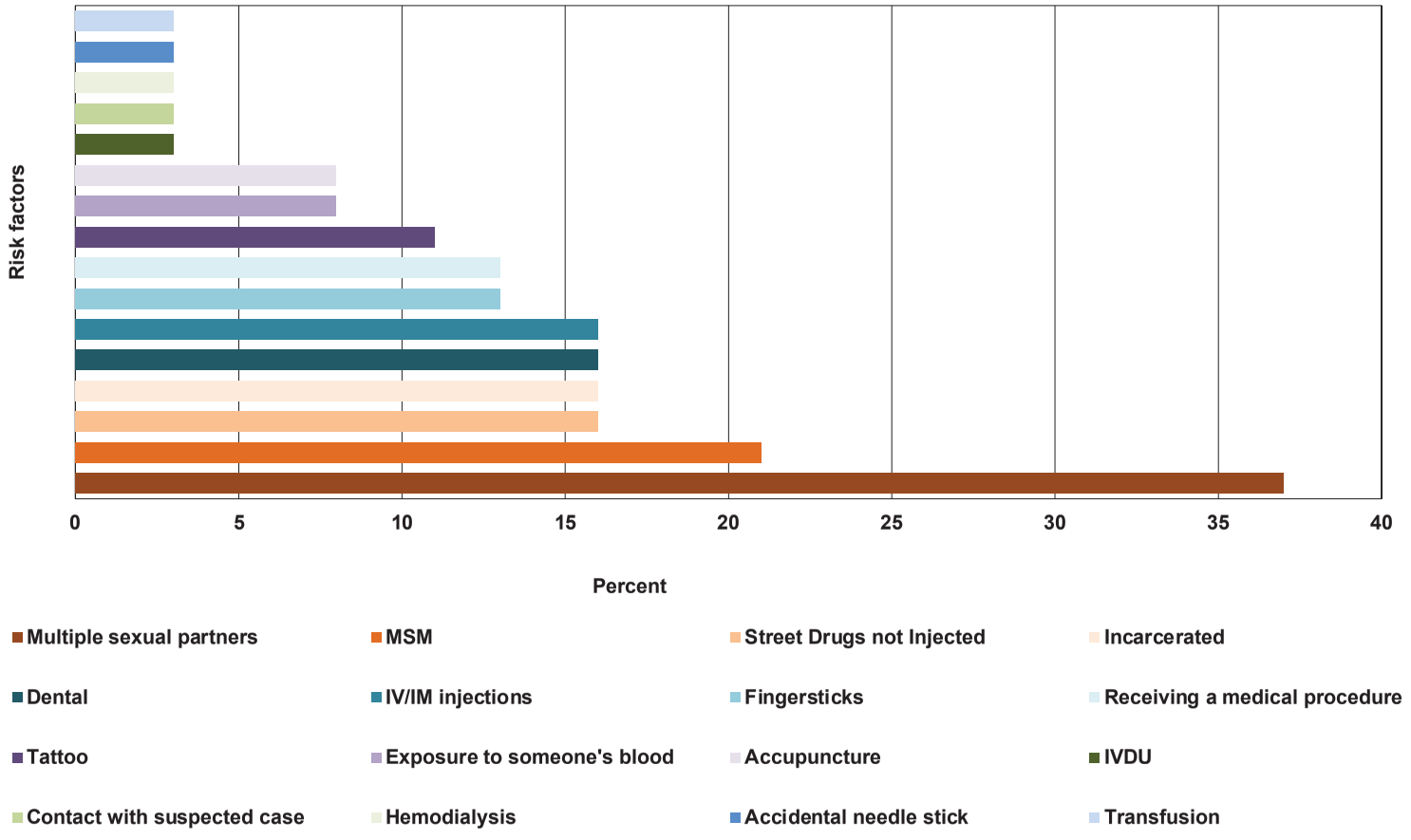
* Rates based on fewer than 19 cases are unreliable

**Figure 4. Incidence Rates* of Hepatitis B by SPA
LAC, 2012 (N=38)**



* Rates based on fewer than 19 cases are unreliable

Fig. 5. Hepatitis B Reported Risk Factors*
LAC, 2012 (n=38)



*Includes cases with multiple risk factors

HEPATITIS B, PERINATAL

CRUDE DATA	
Infants Born to HBsAg+ Mothers	867
Incidence of Exposure[a] LA County	6.5
HBsAg+ Infants[b]	1
Maternal Age at Diagnosis	
Mean	31.9 years
Median	32 years
Range	17-45 years
Infant Age at Diagnosis	12 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2012.
[b]Based on number of infants that had post vaccine serology testing.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). A woman can transmit the HBV to her infant during pregnancy and from exposure to cervical secretions and blood during the birthing process. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a three-dose vaccine series, has demonstrated 85 to 95% effectiveness in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Unit (PHBPU) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure to the HBsAg-positive mother for greater than one year (often limited to nuclear family).

2012 TRENDS AND HIGHLIGHTS

- Eight hundred sixty-seven infants (includes thirteen sets of twins) were born to 854 HBsAg+ women.
- The incidence of exposure increased by 23% from 5.3 to 6.5 per 1000 infants born in 2012 compared to 2011 (Figure 1).
- Sixty-nine percent (n=589) of women screened for HBsAg were 15-34 years of age.
- Eighty-seven percent (n=741) of HBsAg+ women were born outside of the United States.
- Seventy-nine percent (n=678) of HBsAg+ women were Asian followed by 5% (n=46) Hispanic, 5% (n=41) white, 5% (n=39) unknown, 4% (n=30) black, 1% (n= 14) other and 1% (n=6) Pacific Islander. (Figures 2 and 3).
- Fifty-eight percent (n=491) of the HBsAg+ women reside in Service Planning Area (SPA) 3, which has a large Asian population (Figure 4).
- Ninety-eight percent (n=848) of infants received the first dose of Hepatitis B vaccine and HBIG within 12 hours of birth (Figure 5).
- Six percent (n=55) of infants born to HBsAg+ women received post-vaccination serology (PVS) testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. Infants born in the later part of 2012 are too young for PVS testing. One infant was HBsAg+, indicating infection (Figure 6).
- Among the HHCs, 38% (n=460) were 0-10 years and 33% (n=394) were 31-40 years (Figure 7).
- Hepatitis B virus marker status of HHCs (n=1185) was: 65% (n=771) were previously immunized by report. For the others, 16% (n=184) had positive antibodies to HBsAg (anti-HBs), 12% (n=140) were HBsAg negative, 3% (n=34) were susceptible (anti-

HBs negative), 2% (n=31) were infected (HBsAg-positive), 1% (n=16) had positive hepatitis B core antibodies and 1% (n=9) were unknown. The PHBPU recommends the Hepatitis B vaccine series for those who are susceptible (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2008-2012

	2008 (N=778)			2009 (N=760)			2010 (N=653)			2011 (N=700)			2012 (N=854)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.00
15-34	550	70.7	19.2	520	58.4	18.4	448	68.6	15.2	476	68	16.1	589	69.0	20
35-44	225	28.9	14.9	237	31.2	10.7	204	31.2	14.2	219	31.3	15.2	263	31.0	18.3
45-54	3	0.4	0.2	3	0.4	0.2	0	0	0	2	0.3	0.1	1	0.1	0.1
55-64	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
65+	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	0	0.0		0	0.0		1	0.2		3	0.4		1	0.1	
Race/Ethnicity															
Asian	611	78.5	46.9	570	75.0	43.8	491	75.2	37.4	555	79.3	42.3	678	79.0	51.7
Black	32	4.1	3.7	33	4.0	3.9	22	3.4	2.6	25	3.6	2.9	30	4.0	3.5
Hispanic	71	9.1	1.5	76	10.0	1.6	50	7.7	1.1	55	7.9	1.2	46	5.0	1.0
White	30	3.9	1.0	40	5.0	1.4	38	5.8	1.3	33	4.7	1.2	41	5.0	1.4
Other	34	4.4	137	41	5.0	1.6	19	2.9	40.4	13	1.9	34.9	20	2.3	82.4
Unknown	0	0.0		0	0.0		33	5.1		19	2.7		39	5.0	
SPA															
1	4	0.5	1.1	6	0.8	1.6	9	1.4	2.4	10	1.4	2.7	15	1.8	4.0
2	96	12.3	4.4	117	15.4	5.3	85	13	3.8	78	11.1	3.5	93	10.9	4.2
3	394	50.6	22.7	355	46.7	20.5	329	50.4	19.0	369	52.7	21.3	491	57.5	28.3
4	96	12.3	7.5	83	10.9	6.7	83	12.7	6.6	74	10.6	5.9	82	9.6	6.5
5	37	4.8	5.7	32	4.2	4.9	19	2.9	2.9	30	4.3	4.5	34	4.0	5.2
6	43	5.5	4.1	38	5.0	3.6	19	2.9	1.8	29	4.1	2.7	24	2.8	2.2
7	55	7.1	4.0	50	6.6	3.6	42	6.4	3.0	46	6.6	3.3	34	4.0	2.5
8	50	6.4	4.4	75	9.9	6.7	58	8.9	5.2	47	6.7	4.2	69	8.1	6.1
Unknown	3	0.4		4	0.5		9	1.4		17	2.4		12	1.4	

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

Figure 1. Perinatal Hepatitis B Incidence of Exposure LAC, 2002-2012

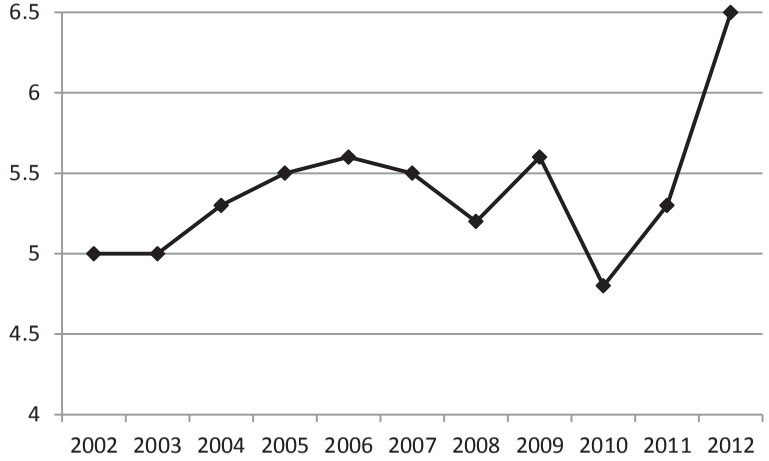
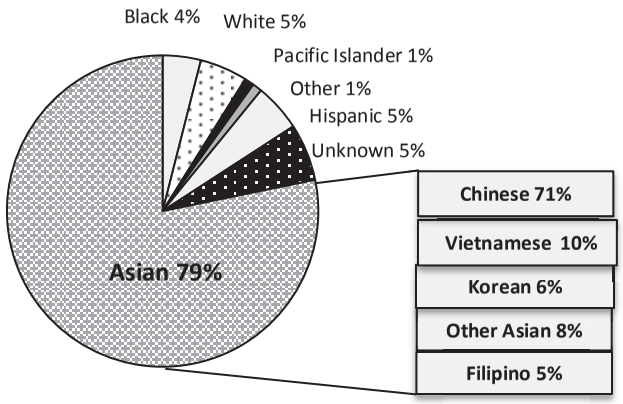


Figure 2.
Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2012 (N=854)



Other includes Native-American and any racial group that cannot be categorized as Asian, Black, Hispanic, White or unknown. Other Asian is Japanese, Asian-Indian, Cambodian non-Hmong, Thai, Lao or unknown Asian.

Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity LAC, 2004-2012 (N= 6817)

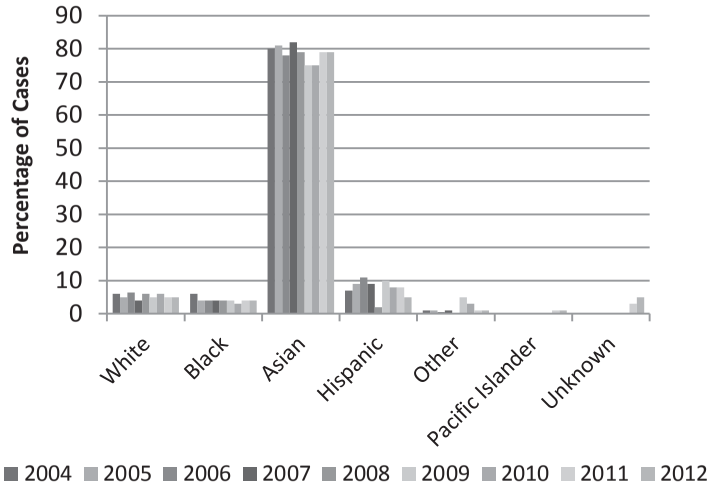


Figure 4. Perinatal Hepatitis B Maternal by SPA LAC, 2012 (N=854)

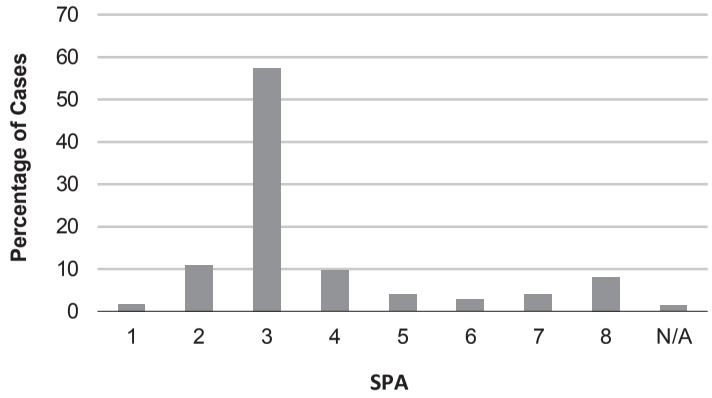
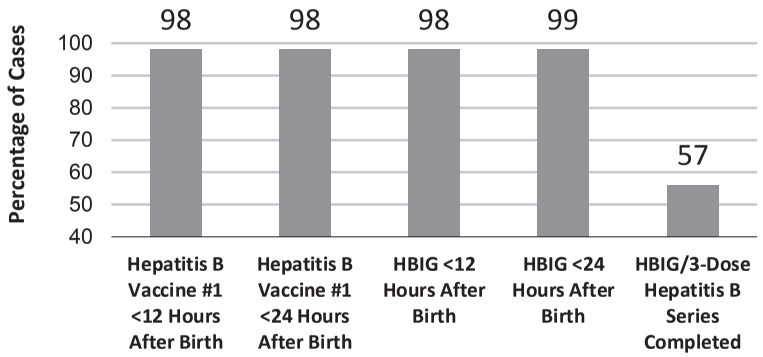
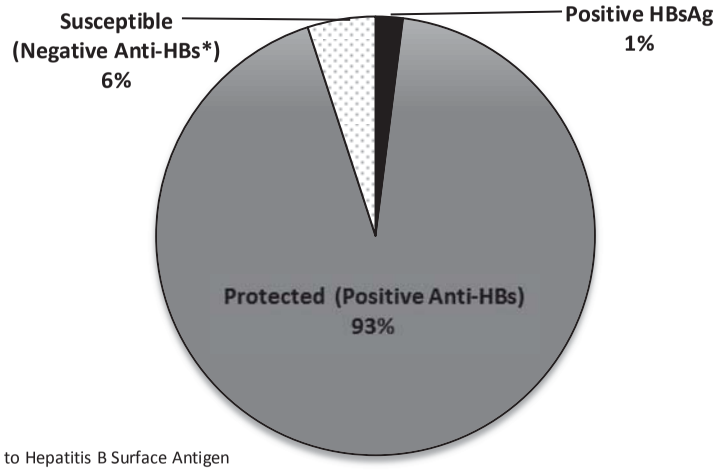


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2012 (N=867)



Note: As of the date of this report, many infants born in the later part of 2012 are not due to receive the 3rd dose hepatitis B vaccine.

Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology (PVS) Results LAC, 2012 (N=55)



*Antibody to Hepatitis B Surface Antigen

Note: As of the date of this report, many infants born in the later part of 2012 are not eligible for PVS testing. PVS testing is recommended at 9-18 months of age after completion of at least 3 doses of hepatitis B vaccine.

Figure 7. Perinatal Hepatitis B Household & Sexual Contacts Age Range, LAC, 2012 (N=1217)

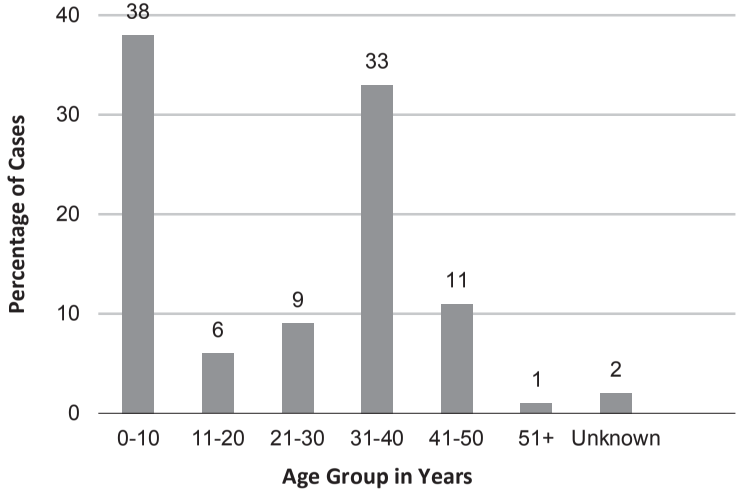
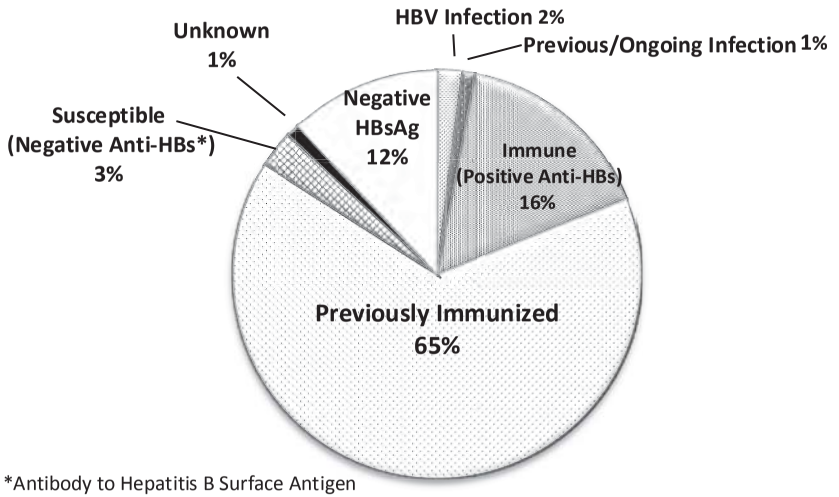


Figure 8. Hepatitis B Status of Household Contacts LAC, 2012 (N=1185)



*Antibody to Hepatitis B Surface Antigen

HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	60
Annual Incidence[a]	
LA County	0.61
California[b]	0.42
United States[b]	0.93
Age at Diagnosis	
Mean	47
Median	48
Range	21-84 years

[a] Cases per 100,000 population

[b] Calculated from Final 2011 Reports of Nationally Notifiable Infectious Disease. MMWR 61(32);625-637.

DESCRIPTION

Hepatitis B is a DNA-virus transmitted through activities that involve percutaneous or mucosal contact with infectious blood or body fluids, most often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented in the United States (US) and should be considered in persons without traditional risk factors.

Symptoms, which occur in less than half of those acutely infected can include: fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice. Approximately 2-10% of adults infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

The absence of acute hepatitis B in persons under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in the US. This strategy includes: screening all pregnant women and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years.

Adult vaccination is recommended for those in high risk groups including; men who have sex with men (MSM), history of multiple sex partners, injection drug users, incarcerated persons; household and sex contacts of persons with chronic HBV infections, healthcare workers and hemodialysis patients.

In 2011, the Advisory Committee on Immunization Practices (ACIP) recommended that hepatitis B vaccination should be administered to unvaccinated adults with diabetes mellitus aged 19 through 59 years and may also be administered, at the discretion of the treating clinician, to unvaccinated adults with diabetes mellitus aged ≥60 years.

For the purpose of surveillance, LAC DPH uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

2011 TRENDS AND HIGHLIGHTS

- The 2011 incidence rate increased from the previous year (0.61 per 100,000 versus 0.55 per 100,000) (Figure 1).
- The rate was highest in those between the ages of 45-54 years (1.6 per 100,000), followed by the 55-64 year age group (1.2 per 100,000) (Figure 2).
- The male-to-female ratio was 1:0.5.
- As in 2010, the 2011 incidence rate was highest in blacks (1.5 per 100,000) (Figure 3).
- Three Service Planning Areas (SPA) had rates greater than the overall county mean rate of 0.61 per 100,000)—SPA 4 (1.2 per 100,000), SPA 6 (0.9 per 100,000), and SPA 8 (0.7 per 100,000) (Figure 4).
- Risk factors were identified in 63% (n=32) of the 51 confirmed cases interviewed (including some cases with multiple risk factors). The most common risk factor was MSM (n=11, 52% of males), followed by having multiple sexual partners (n=12, 38%), recent dental work (n=8, 25%), using non-injection street drugs (n=6, 19%), receiving fingersticks (n=5, 16%), having a diagnostic medical procedure (n=4, 13%), having contact with a confirmed or suspected case of hepatitis B (n=3, 9%), living in a long term care facility (n=3, 9%), receiving a tattoo (n=3, 9%), receiving IV/IM injections (n=3, 9%), acupuncture (n=2, 6%), being incarcerated (n=1, 3%), and IVDU (n=1, 3%) (Figure 5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2007-2011

	2007 (N=55)			2008 (N=66)			2009 (N=41)			2010 (N=54)			2011 (N=60)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	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
15-34	9	16.4	0.3	18	27.3	0.6	12	29.3	0.4	18	33.3	0.6	12	20.0	0.4
35-44	21	38.2	1.4	14	21.2	0.9	7	17.1	0.5	13	24.1	0.9	10	16.7	0.7
45-54	12	21.8	0.9	13	19.7	1.0	16	39.0	1.2	11	20.4	0.8	21	35.0	1.6
55-64	3	5.5	0.3	14	21.2	1.5	4	9.7	0.4	7	13.0	0.7	12	20.0	1.2
65+	9	16.4	0.9	7	10.6	0.7	2	4.9	0.2	5	9.2	0.5	5	8.3	0.5
Unknown	1	1.8		0	0		0	0		0	0		0	0	
Race/Ethnicity															
Asian	7	12.7	0.5	7	10.6	0.5	5	12.2	0.4	11	20.4	0.8	3	5.0	0.2
Black	11	20.0	1.3	15	22.7	1.8	11	26.8	1.3	14	25.9	1.6	13	21.7	1.5
Hispanic	16	29.1	0.3	16	24.2	0.3	12	29.3	0.3	14	25.9	0.3	19	31.7	0.4
White	19	34.5	0.7	22	33.3	0.8	11	26.8	0.4	14	25.9	0.5	23	38.3	0.8
Other	2	3.6	9.6	1	1.5	4.1	0	0		1	1.8		0	0	
Unknown	0	0.0		5	7.6		2	4.9		0	0		2	3.3	
SPA															
1	1	1.8	0.3	2	3.0	0.5	0	0	0	2	3.7	0.5	0	0	0.0
2	13	23.6	0.6	9	13.6	0.4	4	9.8	0.2	5	9.3	0.2	13	21.7	0.6
3	4	7.3	0.2	6	9.1	0.3	6	14.6	0.3	10	18.5	0.6	8	13.3	0.5
4	14	25.5	1.1	7	10.6	0.5	13	31.7	1.0	8	14.8	0.6	15	25.0	1.2
5	5	9.1	0.8	9	13.6	1.4	1	2.4	0.2	4	7.4	0.6	1	1.7	0.2
6	9	16.4	0.9	22	33.3	2.1	10	24.4	1.0	8	14.8	0.7	10	16.7	0.9
7	4	7.3	0.3	6	9.1	0.4	2	4.9	0.1	7	13.0	0.5	3	5.0	0.2
8	5	9.1	0.4	4	6.1	0.4	4	9.8	0.4	10	18.5	0.9	8	13.3	0.7
Unknown	0	0.0		1	1.5		1	2.4		0	0	0	2	3.3	

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 2007-2011**

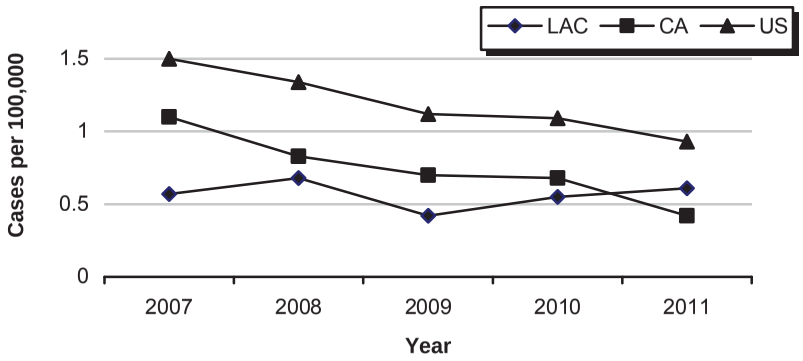
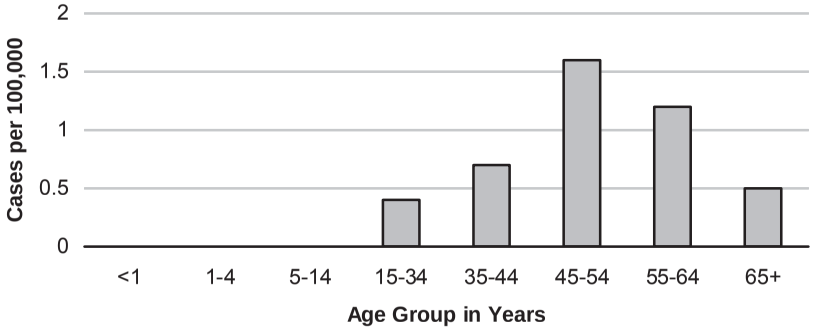


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2011 (N=60)**



* Rates bases on fewer than 19 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2009-2011**

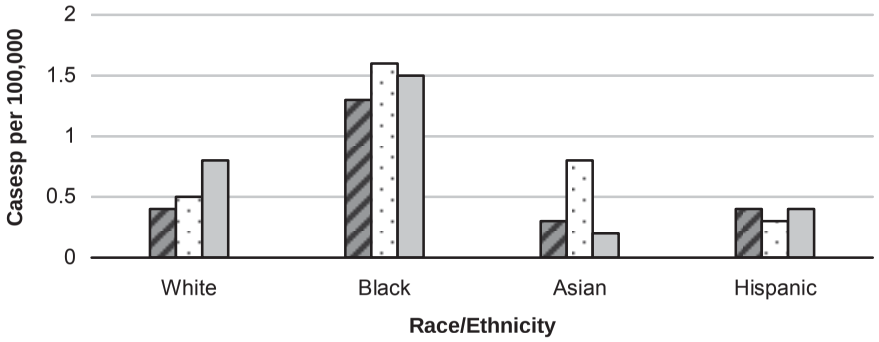
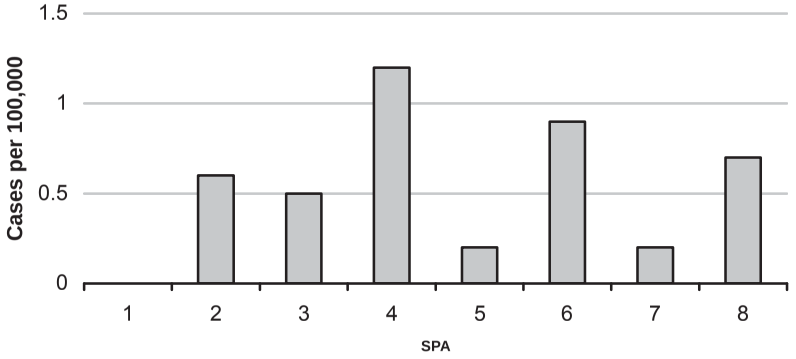
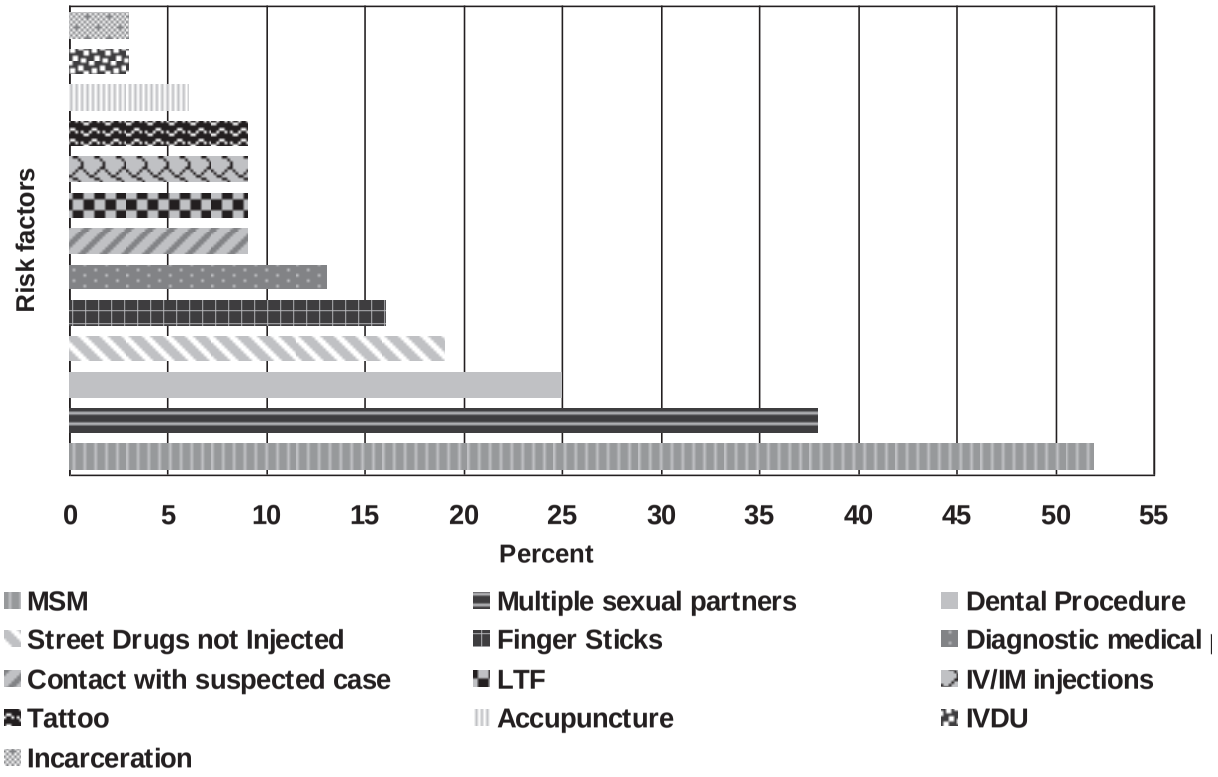


**Figure 4. Incidence Rates* of Acute Hepatitis B by SPA
LAC, 2011 (N=58)**



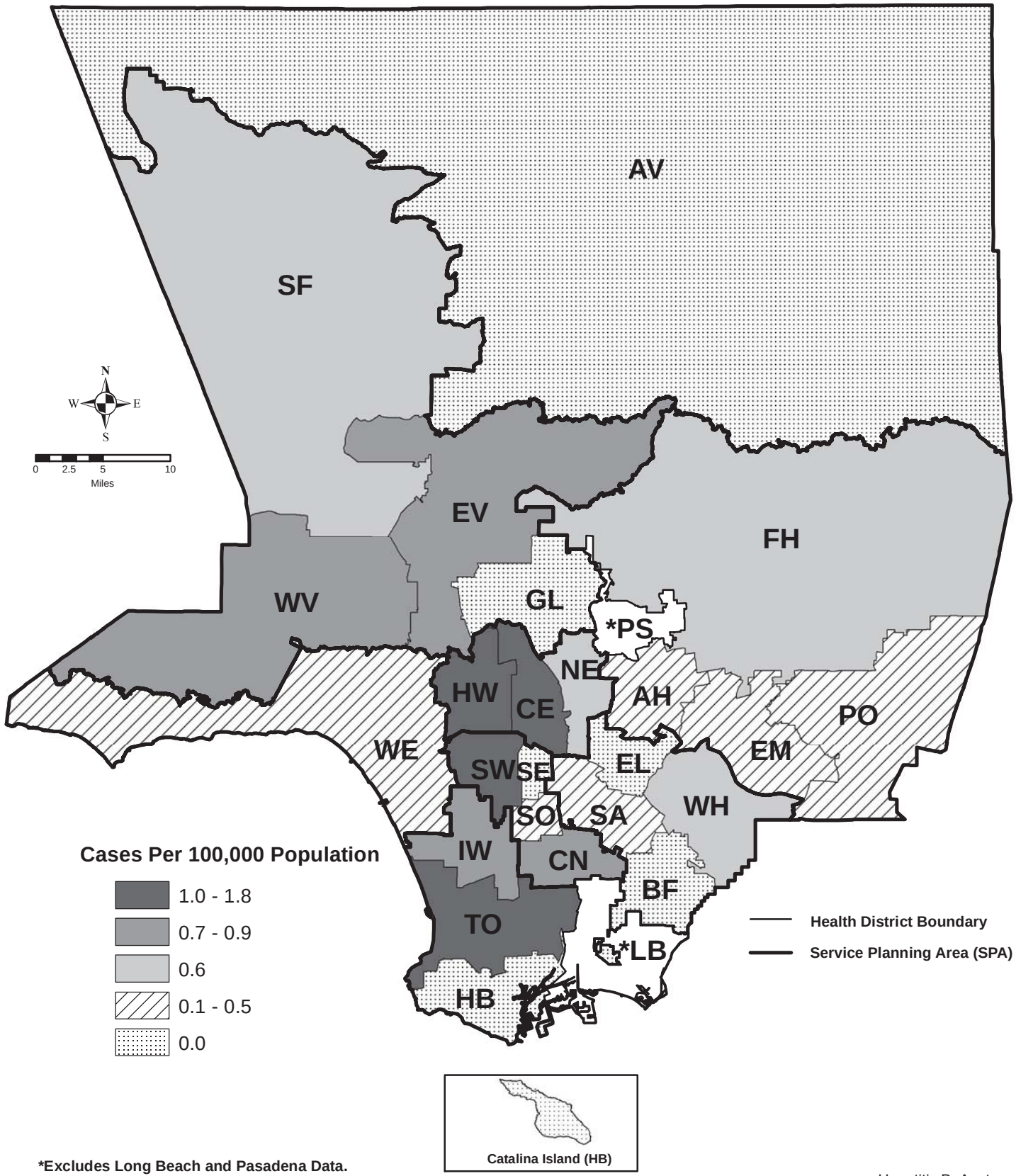
* Rates based on fewer than 19 cases are unreliable

Fig. 5. Hepatitis B Reported Risk Factors*
LAC, 2011 (n=32)



*Includes cases with multiple risk factors

Map 8. Hepatitis B
Rates by Health District, Los Angeles County, 2011*



*Excludes Long Beach and Pasadena Data.

HEPATITIS B, PERINATAL

CRUDE DATA	
Infants Born to HBsAg+ Mothers	710
HBsAg+ Infants[a]	1
Incidence of Exposure[b]	
LA County	5.3
Maternal Age at Diagnosis	
Mean	31.9 years
Median	32 years
Range	18-51years
Infant Age at Diagnosis	12 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2011.
[b]Based on number of infants that had post vaccine serology testing.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during pregnancy and from exposure to cervical secretions and blood during the birthing process. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a three-dose vaccine series, has demonstrated 85 to 95% effectiveness in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Unit (PHBPU) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure for greater than one year (often limited to nuclear family).

2011 TRENDS AND HIGHLIGHTS

- In 2011, 710 infants (this includes ten twins) were born to 700 HBsAg+ women.
- The incidence of exposure increased from 2010 by 10% from 4.8 to 5.3 per 1000 infants born in 2011 (Figure 1).
- Sixty-eight percent (n=476) of women screened for HBsAg were between 15 and 34 years of age.
- Eighty-three percent (n=583) of HBsAg+ women were born outside of the United States.
- In 2011, 79% (n=555) of HBsAg+ women were Asian followed by 8% (n=55) Hispanic, 5% (n=33) White, 3% (n=19) unknown, 4% (n=25) Black, 1% (n= 9) other and 1% (n=4) Pacific Islander. (Figures 2 and 3).
- Fifty-three percent (n=369) of the HBsAg+ women reside in Service Planning Area (SPA) 3, which has a large Asian population (Figure 4).
- Ninety-nine percent (n=703) of infants received the first dose of Hepatitis B vaccine and HBIG within 24 hours of birth (Figure 5).
- In 2011, 12% (n=82) of infants born to HBsAg+ women received post-vaccination serology (PVS) testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. Infants born in the later part of 2011 are too young for PVS testing. One infant was HBsAg+, indicating infection (Figure 6).
- Among the HHCs, 37% (n=367) were 0-10 years and 31% (n=306) were 31-40 years (Figure 7).
- Hepatitis B virus marker status of HHCs (n=985): Fifty-eight percent (n=566) were previously immunized, 18% (n=150) were HBsAg negative, 15% (n=146) were immune 4% (n=36) were infected and 4% (n=35) had previous/ongoing infection. The Hepatitis B vaccine series was recommended for those who were susceptible (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2007-2011

	2007 (N=774)			2008 (N=778)			2009 (N=760)			2010 (N=653)			2011 (N=700)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	1	0.1	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	567	73.3	20.1	550	70.7	19.2	520	58.4	18.4	448	68.6	15.2	476	68	16.1
35-44	206	26.6	13.7	225	28.9	14.9	237	31.2	10.7	204	31.2	14.2	219	31.3	15.2
45-54	0	0.0	0.0	3	0.4	0.2	3	0.4	0.2	0	0	0	2	0.3	0.1
55-64	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
65+	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	0	0.0		0	0.0		0	0.0		1	0.2		3	0.4	
Race/Ethnicity															
Asian	636	82.2	49.5	611	78.5	46.9	570	75.0	43.8	491	75.2	37.4	555	79.3	42.3
Black	28	3.6	3.3	32	4.1	3.7	33	4.0	3.9	22	3.4	2.6	25	3.6	2.9
Hispanic	70	9.0	1.5	71	9.1	1.5	76	10.0	1.6	50	7.7	1.1	55	7.9	1.2
White	29	3.7	1.0	30	3.9	1.0	40	5.0	1.4	38	5.8	1.3	33	4.7	1.2
Other	11	1.4	52.8	34	4.4	137	41	5.0	1.6	19	2.9	40.4	13	1.9	34.9
Unknown	0	0.0		0	0.0		0	0.0		33	5.1		19	2.7	
SPA															
1	8	1.0	2.2	4	0.5	1.1	6	0.8	1.6	9	1.4	2.4	10	1.4	2.7
2	100	12.9	4.6	96	12.3	4.4	117	15.4	5.3	85	13	3.8	78	11.1	3.5
3	392	50.6	22.7	394	50.6	22.7	355	46.7	20.5	329	50.4	19.0	369	52.7	21.3
4	88	11.4	7.0	96	12.3	7.5	83	10.9	6.7	83	12.7	6.6	74	10.6	5.9
5	33	4.3	5.2	37	4.8	5.7	32	4.2	4.9	19	2.9	2.9	30	4.3	4.5
6	33	4.3	3.2	43	5.5	4.1	38	5.0	3.6	19	2.9	1.8	29	4.1	2.7
7	54	7.0	3.9	55	7.1	4.0	50	6.6	3.6	42	6.4	3.0	46	6.6	3.3
8	66	8.5	5.9	50	6.4	4.4	75	9.9	6.7	58	8.9	5.2	47	6.7	4.2
Unknown	0	0.0		3	0.4		4	0.5		9	1.4		17	2.4	

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

**Figure 1. Perinatal Hepatitis B Incidence of Exposure
LAC, 2000-2011**

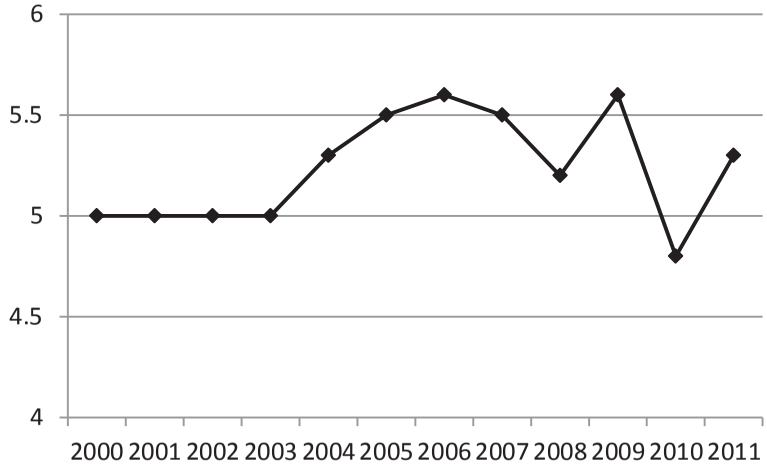
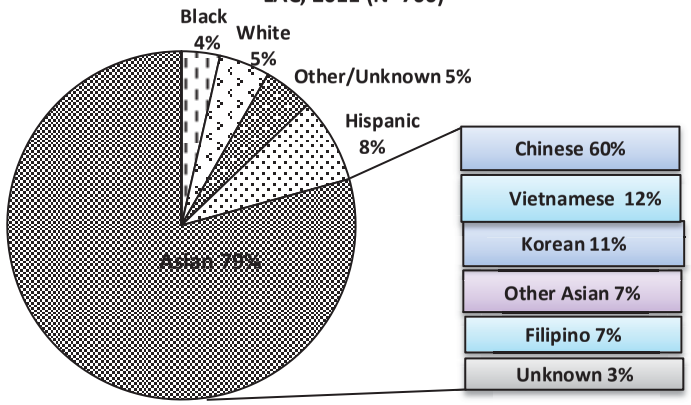


**Figure 2.
Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2011 (N=700)**



Other includes Pacific Islander, Native-American and any racial group that cannot be categorized as Asian, Black, Hispanic, White or unknown. Other Asian is Asian-Indian, Cambodian non-Hmong, Thai, Lao or unknown Asian.

**Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2004-2011 (N= 5963)**

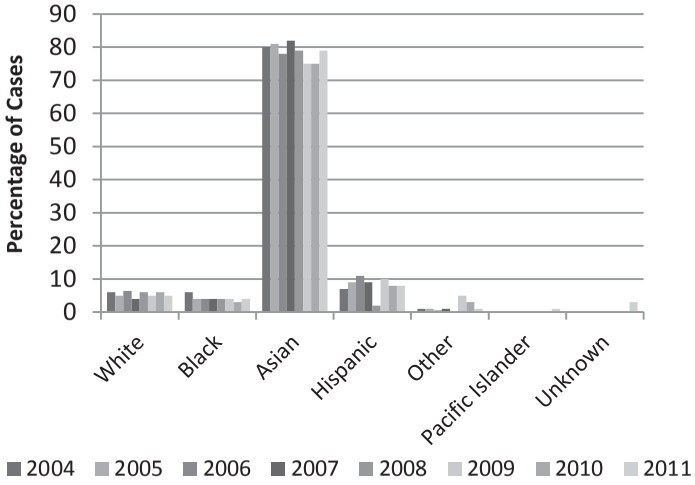


**Figure 4. Perinatal Hepatitis B Maternal by SPA
LAC, 2011 (N=700)**

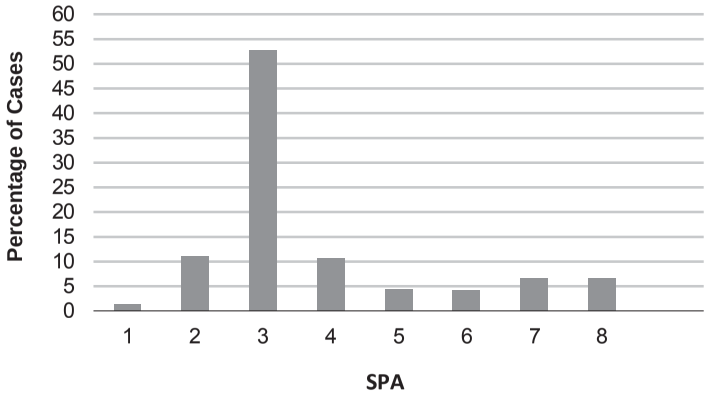
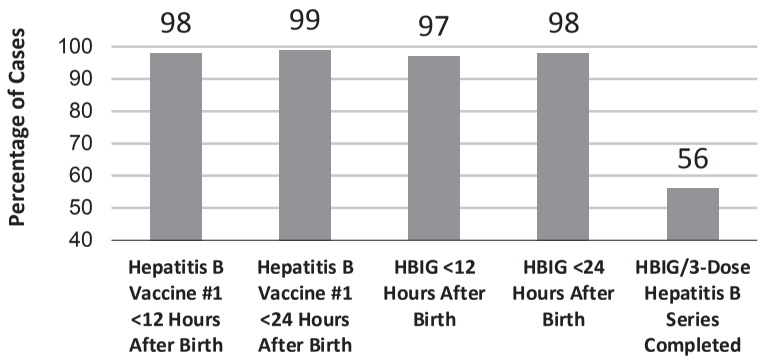
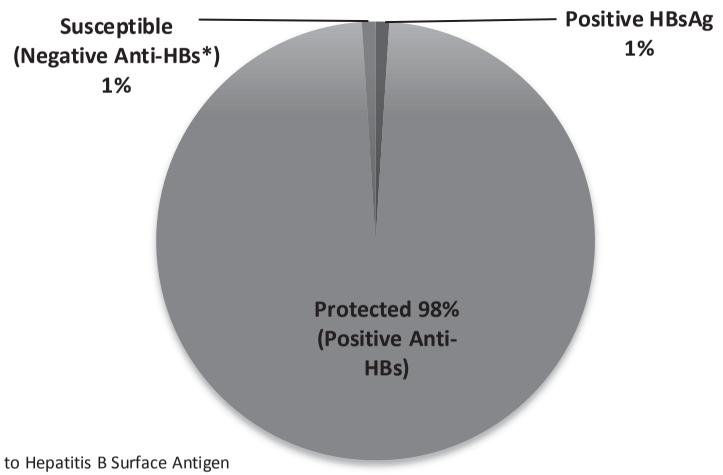


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2011 (N=710)



Note: As of the date of this report, many infants born in the later part of 2011 are not due to receive the 3rd dose hepatitis B vaccine.

Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology (PVS) Results LAC, 2011 (N=82)



*Antibody to Hepatitis B Surface Antigen
Note: As of the date of this report, many infants born in the later part of 2011 are not eligible for PVS testing. PVS testing is recommended at 9-18 months of age after completion of at least 3 doses of hepatitis B vaccine.

Figure 7. Perinatal Hepatitis B Household & Sexual Contacts Age Range, LAC, 2011 (N=985)

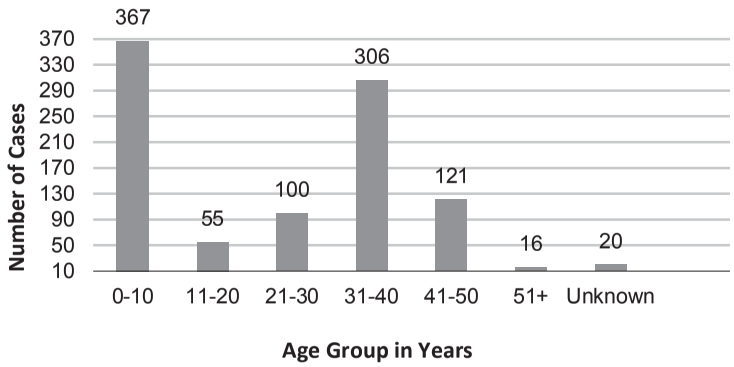
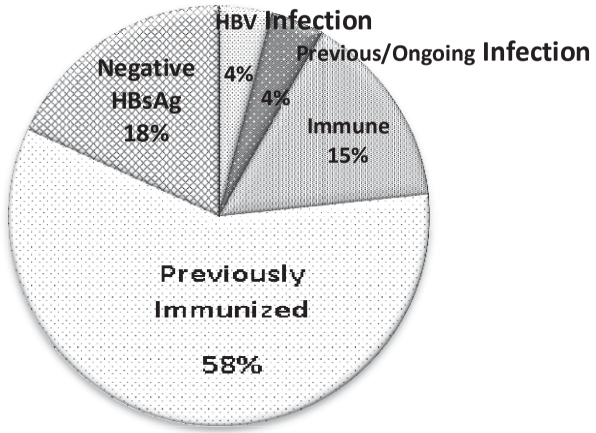


Figure 8. Hepatitis B Status of Household Contacts LAC, 2011 (N=985)



HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	54
Annual Incidence[a]	
LA County	0.55
California[b]	--
United States[b]	--
Age at Diagnosis	
Mean	43
Median	41
Range	21-83 years

[a] Cases per 100,000 population

[b] See Final Summary of Nationally Notifiable Infectious Diseases, United States on MMWR website http://www.cdc.gov/mmwr/mmwr_nd/index.html.

DESCRIPTION

Hepatitis B is a DNA-virus transmitted through percutaneous or mucous membrane exposure, most often through injection drug use, sexual contact with an infected person, or contact from an infected mother to her infant during birth. Transmission also occurs among household contacts of a person with hepatitis B. Healthcare-associated transmission of hepatitis B is documented infrequently in the United States (US) but should be considered in persons without traditional risk factors. Symptoms, which occur in less than half of those acutely infected, may be very mild and flu-like: anorexia, nausea, fatigue, abdominal pain, muscle or joint aches, jaundice and mild fever. Approximately 2-10% of adults infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV. Hepatitis B infection is vaccine preventable.

For the purpose of surveillance, LAC DPH uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

The absence of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in the US. This strategy includes: preventing perinatal HBV transmission by screening all pregnant women for HBsAg and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years. In addition, DPH provides hepatitis B vaccine to high-risk persons at no charge.

New strategies are needed to reduce high-risk behaviors and provide resources for low-cost hepatitis B immunization, particularly for adults with the highest rates of transmission. Development and implementation of such strategies are possible through collaboration between public health, community-based organizations, and other agencies that serve target populations. Additionally, education aims to eliminate, reduce, or mitigate high-risk behaviors in sexually active adults and those who use injection drugs; and to increase awareness and knowledge in the community.

2010 TRENDS AND HIGHLIGHTS

- The 2010 incidence rate increased from the previous year (0.55 per 100,000 versus 0.42 per 100,000) (Figure 1).
- The rate was highest in those between the ages of 35-44 years (0.9 per 100,000), followed by the 45-54 year age group (0.8 per 100,000) (Figure 2).
- The male-to-female ratio was 1:0.42.
- The 2010 incidence rate was highest in blacks (1.6 per 100,000) followed by Asians (0.8 per 100,000), whites (0.5 per 100,000) and Hispanics (0.3 per 100,000) (Figure 3).
- SPA 8 had the highest incidence rate (0.9 per 100,000) while SPA 2 had the lowest incident rate (0.2 per 100,000). (Figure 4),
- Risk factors were identified in 70% (n=35) of the 50 confirmed cases interviewed (including some cases with multiple risk factors). The most common risk factors were having multiple sexual partners (n=17, 49%), MSM behavior (n=11, 31%), having contact with a confirmed or suspected case of hepatitis B (n=4, 11%), recent dental work (n=4, 11%), having a diagnostic medical procedure or surgery (n=4, 11%), receiving a tattoo at home (n=4, 11%), using non-injection street drugs (n=4, 11%), being incarcerated (n=4, 11%), receiving fingersticks (n=3, 9%), and IV/IM injections (n=3, 9%), (Figure 5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010

	2006 (N=62)			2007 (N=55)			2008 (N=66)			2009 (N=41)			2010 (N=54)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0	0	0	0
15-34	20	32.3	0.7	9	16.4	0.3	18	27.3	0.6	12	29.3	0.4	18	33.3	0.6
35-44	21	33.9	1.4	21	38.2	1.4	14	21.2	0.9	7	17.1	0.5	13	24.1	0.9
45-54	15	24.2	1.2	12	21.8	0.9	13	19.7	1.0	16	39.0	1.2	11	20.4	0.8
55-64	3	4.8	0.3	3	5.5	0.3	14	21.2	1.5	4	9.7	0.4	7	13.0	0.7
65+	3	4.8	0.3	9	16.4	0.9	7	10.6	0.7	2	4.9	0.2	5	9.2	0.5
Unknown	0	0.0		1	1.8		0	0.0		0	0		0	0	
Race/Ethnicity															
Asian	10	16.1	0.8	7	12.7	0.5	7	10.6	0.5	5	12.2	0.4	11	20.4	0.8
Black	4	6.5	0.5	11	20.0	1.3	15	22.7	1.8	11	26.8	1.3	14	25.9	1.6
Hispanic	26	41.9	0.6	16	29.1	0.3	16	24.2	0.3	12	29.3	0.3	14	25.9	0.3
White	21	33.9	0.7	19	34.5	0.7	22	33.3	0.8	11	26.8	0.4	14	25.9	0.5
Other	0	0.0	0.0	2	3.6	9.6	1	1.5	4.1	0	0	0	1	1.8	
Unknown	1	1.6		0	0.0		5	7.6		2	4.9		0	0	
SPA															
1	2	3.2	0.6	1	1.8	0.3	2	3.0	0.5	0	0	0	2	3.7	0.5
2	15	24.2	0.7	13	23.6	0.6	9	13.6	0.4	4	9.8	0.2	5	9.3	0.2
3	6	9.7	0.3	4	7.3	0.2	6	9.1	0.3	6	14.6	0.3	10	18.5	0.6
4	16	25.8	1.3	14	25.5	1.1	7	10.6	0.5	13	31.7	1.0	8	14.8	0.6
5	3	4.8	0.5	5	9.1	0.8	9	13.6	1.4	1	2.4	0.2	4	7.4	0.6
6	6	9.7	0.6	9	16.4	0.9	22	33.3	2.1	10	24.4	1.0	8	14.8	0.7
7	6	9.7	0.4	4	7.3	0.3	6	9.1	0.4	2	4.9	0.1	7	13.0	0.5
8	6	9.7	0.5	5	9.1	0.4	4	6.1	0.4	4	9.8	0.4	10	18.5	0.9
Unknown	2	3.2		0	0.0		1	1.5		1	2.4		0	0	0

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 2001-2010**

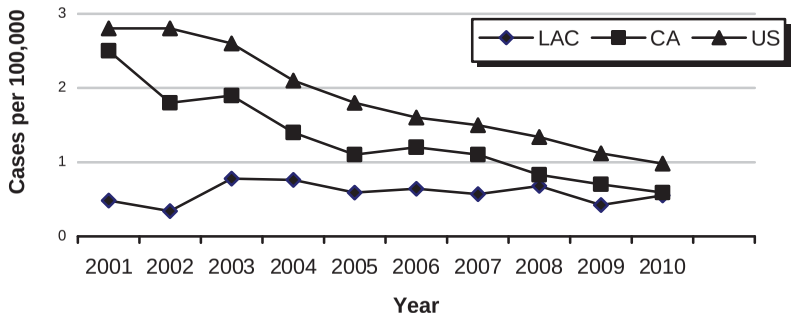
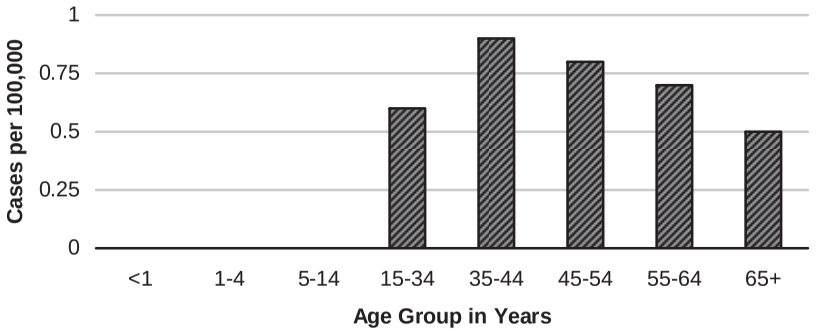


**Figure 2. Incidence Rates* of Acute Hepatitis B by Age Group
LAC, 2010 (N=54)**



* Rates bases on fewer than 19 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence Rates* by Race/Ethnicity
LAC, 2006-2010 (N=54)**

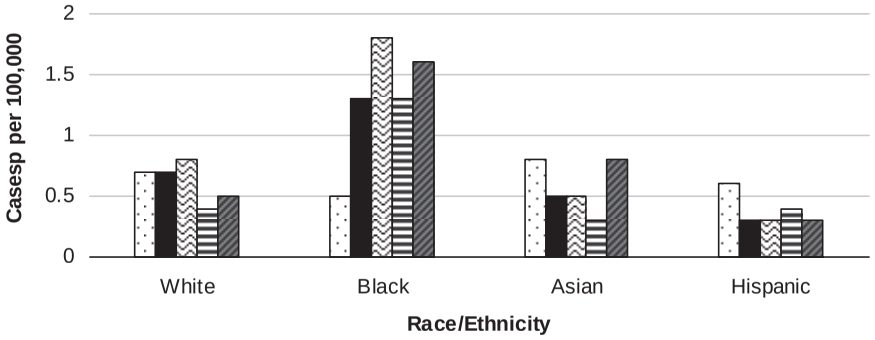
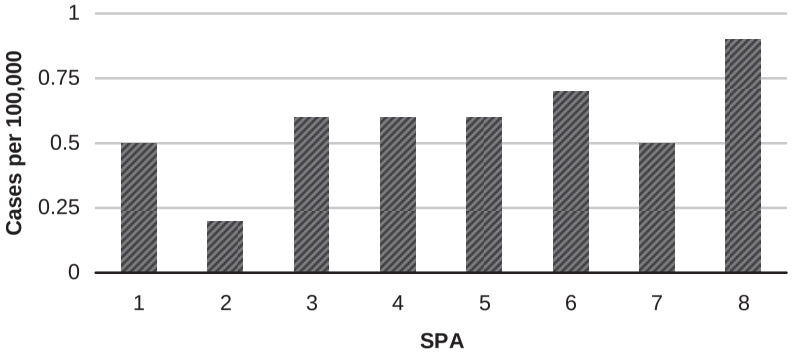
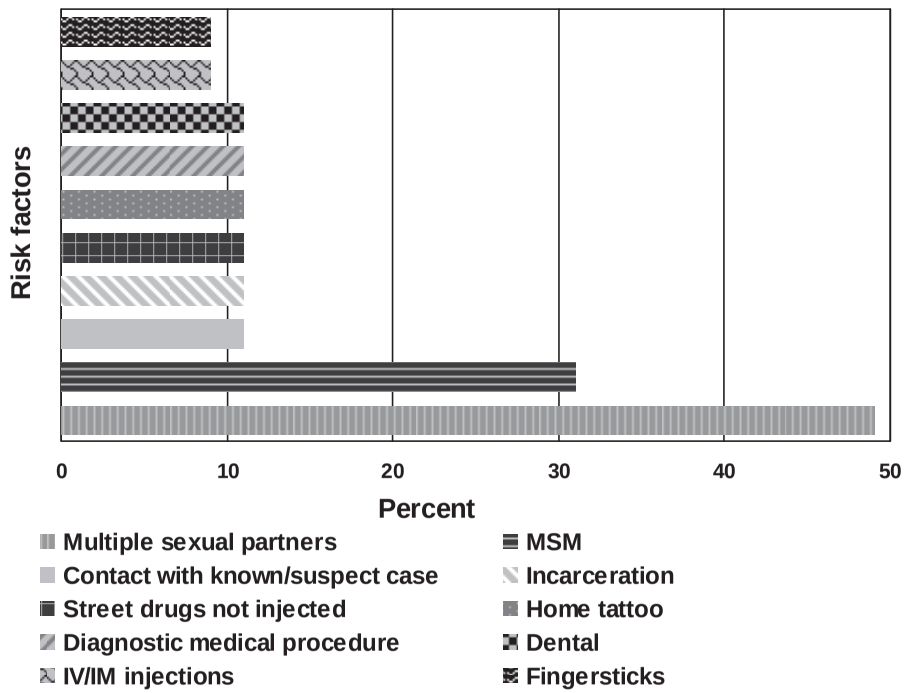


**Figure 4. Incidence Rates* of Acute Hepatitis B by SPA
LAC, 2010 (N=54)**



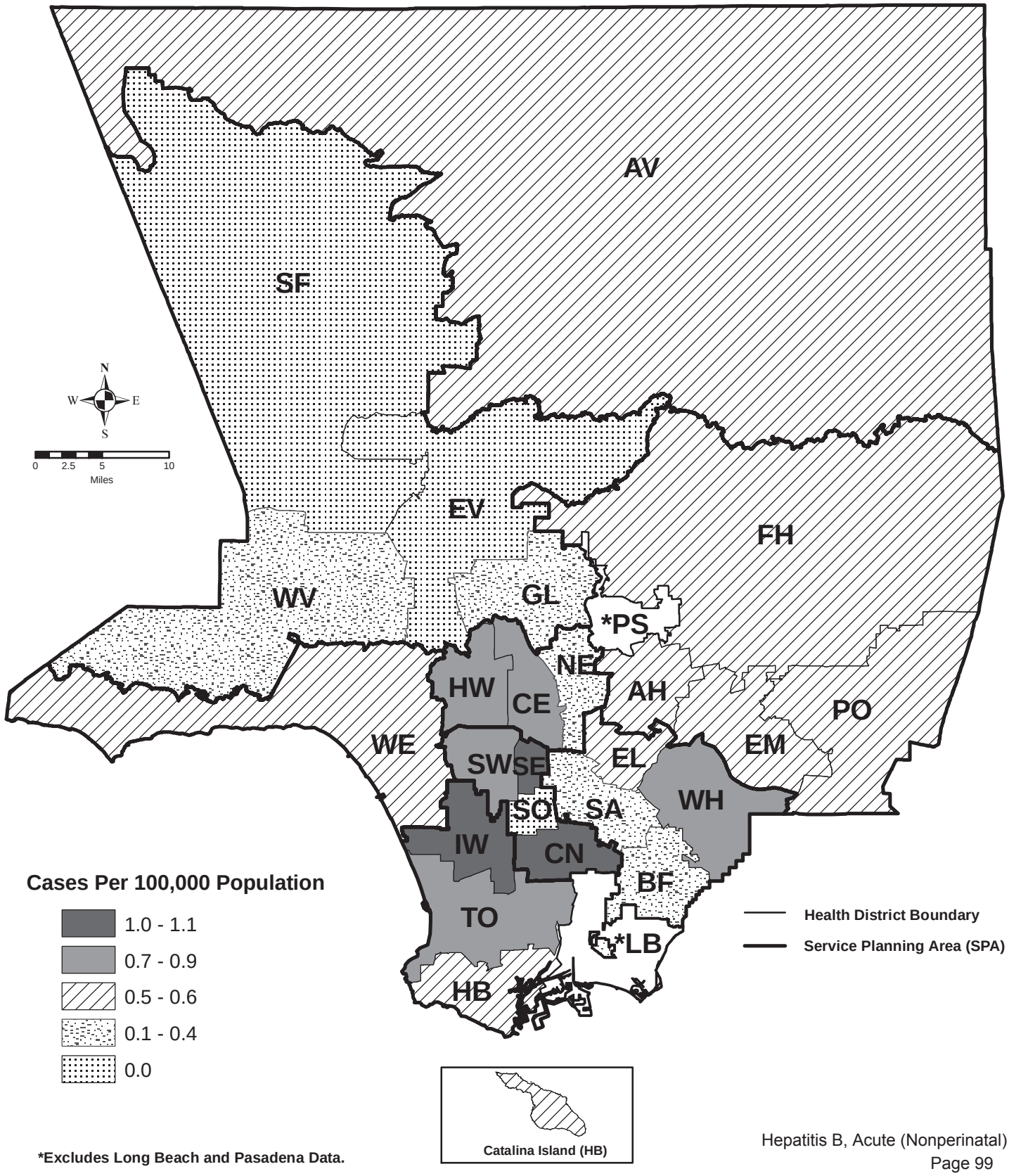
* Rates based on fewer than 19 cases are unreliable

Fig. 5. Hepatitis B Reported Risk Factors*
LAC, 2010 (n=35)



*Includes cases with multiple risk factors

Map 8. Hepatitis B
Rates by Health District, Los Angeles County, 2010*



*Excludes Long Beach and Pasadena Data.

HEPATITIS B, PERINATAL

CRUDE DATA	
Infants Born to HBsAg+ Mothers	669
HBsAg+ Infants	1
Incidence of Exposure[a]	
LA County	4.8
Maternal Age at Diagnosis	
Mean	31.9 years
Median	32 years
Range	17-44 years
Infant Age at Diagnosis	13 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2010.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during pregnancy and from exposure to cervical secretions and blood during the birthing process. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a three-dose vaccine series, has been demonstrated to be 85 to 95% effective in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Unit (PHBPU) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure for greater than one year (often limited to nuclear family).

2010 TRENDS AND HIGHLIGHTS

- In 2010, 669 infants (including 16 sets of twins) were born to 653 HBsAg+ women.
- In 2010, the incidence of exposure decreased by 14% from 5.6 to 4.8 per 1000 infants born in 2010 (Figure 1).
- Over 68% (n=448) of women screened for HBsAg were between 15 and 34 years of age.
- As consistent with previous years, in 2010 the majority of HBsAg+ women were Asian (n=491, 75.2%) followed by Hispanic (n=50, 7.7%, white (n=38, 5.8%), unknown (n=33, 5.1%), black (n=22, 3.4%) and other (n= 19, 3%) (Figures 2 and 3).
- Half of the HBsAg+ women reside in Service Planning Area (SPA) 3 (n=329, 50.4%), which has a large Asian population (Figure 4).
- The majority of infants (n=659, 98.5%) received the first dose of Hepatitis B vaccine and HBIG within 24 hours of birth (Figure 5).
- In 2010, 18.2 % (n=124) of infants born to HBsAg+ women received post-vaccination serology (PVS) testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. PVS results for one infant was HBsAg+, indicating infection (Figure 6).
- Among the HHCs, 36.4% were the age groups 0-10 years (n=324) and 31.5% in 31-40 years (n=280) (Figure 7).
- Hepatitis B virus maker status of HHCs (n=887): 56% (n=494) were previously immunized, 18% (n=162) were HBsAg negative, 4% (n=36) were infected, 14% (n=128) were immune, and 5% (n=51) were susceptible to hepatitis B. The Hepatitis B vaccine series was recommended for those who were susceptible (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2006-2010

	2006 (N=803)			2007 (N=774)			2008 (N=778)			2009 (N=760)			2010 (N=653)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	0	0.0	0.0	1	0.1	0.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15-34	613	76.3	22.0	567	73.3	20.1	550	70.7	19.2	520	58.4	18.4	448	68.6	15.2
35-44	190	23.7	12.6	206	26.6	13.7	225	28.9	14.9	237	31.2	10.7	204	31.2	14.2
45-54	0	0.0	0.0	0	0.0	0.0	3	0.4	0.2	3	0.4	0.2	0	0	0
55-64	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
65+	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	0	0.0		0	0.0		0	0.0		0	0.0		1	0.2	
Race / Ethnicity															
Asian	627	78.1	49.3	636	82.2	49.5	611	78.5	46.9	570	75.0	43.8	491	75.2	37.4
Black	30	3.7	3.6	28	3.6	3.3	32	4.1	3.7	33	4.0	3.9	22	3.4	2.6
Hispanic	90	11.2	1.9	70	9.0	1.5	71	9.1	1.5	76	10.0	1.6	50	7.7	1.1
White	51	6.4	1.8	29	3.7	1.0	30	3.9	1.0	40	5.0	1.4	38	5.8	1.3
Other	4	0.5	14.0	11	1.4	52.8	34	4.4	137	41	5.0	1.6	19	2.9	40.4
Unknown	1	0.1		0	0.0		0	0.0		0	0.0		33	5.1	
SPA															
1	6	0.7	1.7	8	1.0	2.2	4	0.5	1.1	6	0.8	1.6	9	1.4	2.4
2	99	12.3	4.6	100	12.9	4.6	96	12.3	4.4	117	15.4	5.3	85	13	3.8
3	396	49.3	23.0	392	50.6	22.7	394	50.6	22.7	355	46.7	20.5	329	50.4	19.0
4	97	12.1	7.7	88	11.4	7.0	96	12.3	7.5	83	10.9	6.7	83	12.7	6.6
5	37	4.6	5.8	33	4.3	5.2	37	4.8	5.7	32	4.2	4.9	19	2.9	2.9
6	41	5.1	3.9	33	4.3	3.2	43	5.5	4.1	38	5.0	3.6	19	2.9	1.8
7	58	7.2	4.2	54	7.0	3.9	55	7.1	4.0	50	6.6	3.6	42	6.4	3.0
8	56	7.0	5.0	66	8.5	5.9	50	6.4	4.4	75	9.9	6.7	58	8.9	5.2
Unknown	13	1.6		0	0.0		3	0.4		4	0.5		9	1.4	

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

Figure 1. Perinatal Hepatitis B Incidence of Exposure LAC, 1999-2010

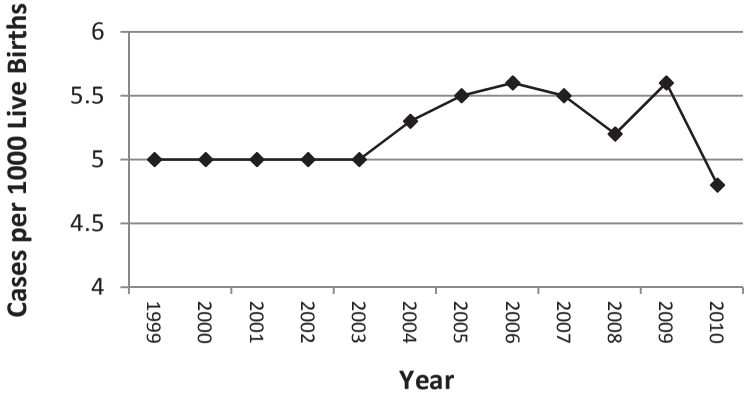
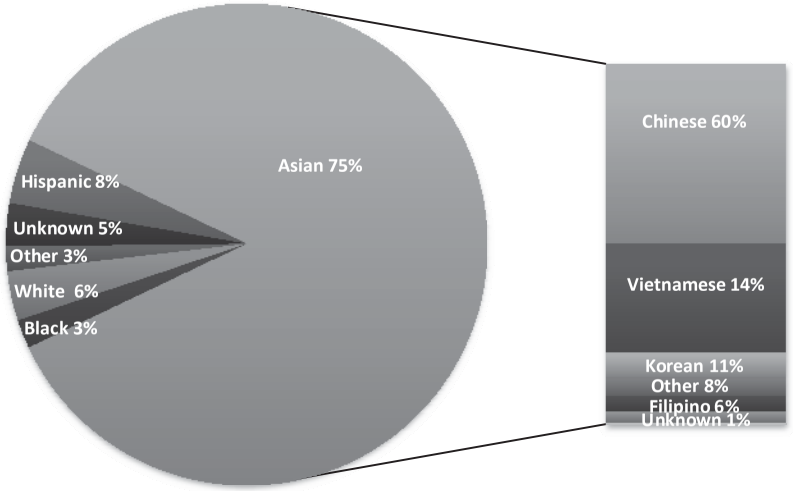


**Figure 2.
Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2010 (N=653)**



Other includes Pacific Islander, Native-American and any racial group that cannot be categorized as Asian, Black, Hispanic, White or unknown. Other Asian is Asian-Indian, Cambodian non-Hmong, Thai, Lao or unknown Asian.

Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity LAC, 2004-2010 (N= 5263)

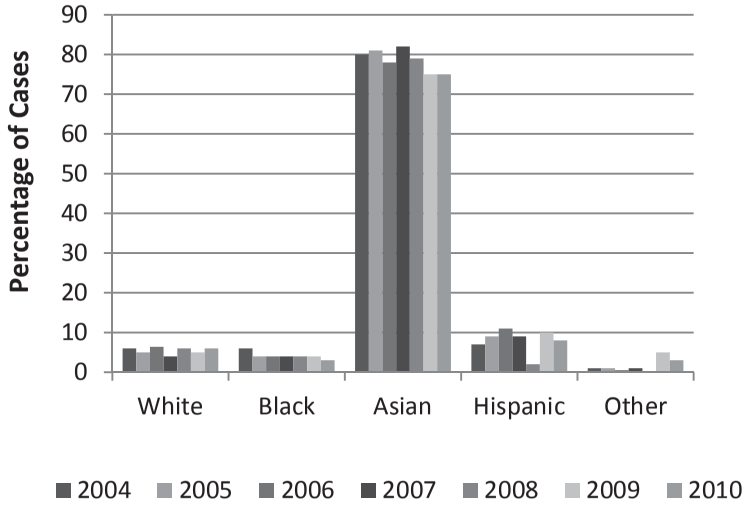


**Figure 4. Perinatal Hepatitis B Maternal by SPA
LAC, 2010 (N=653)**

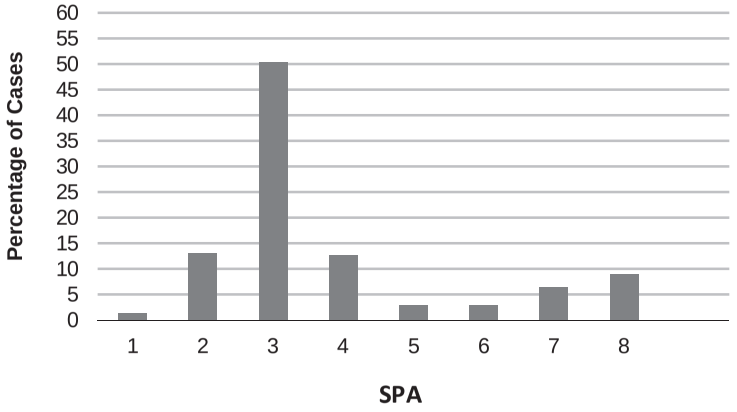
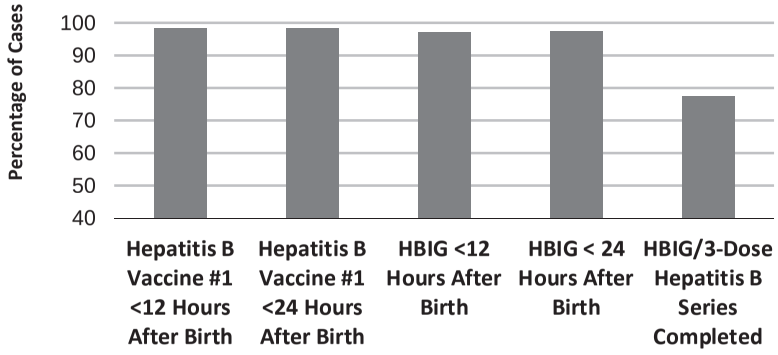
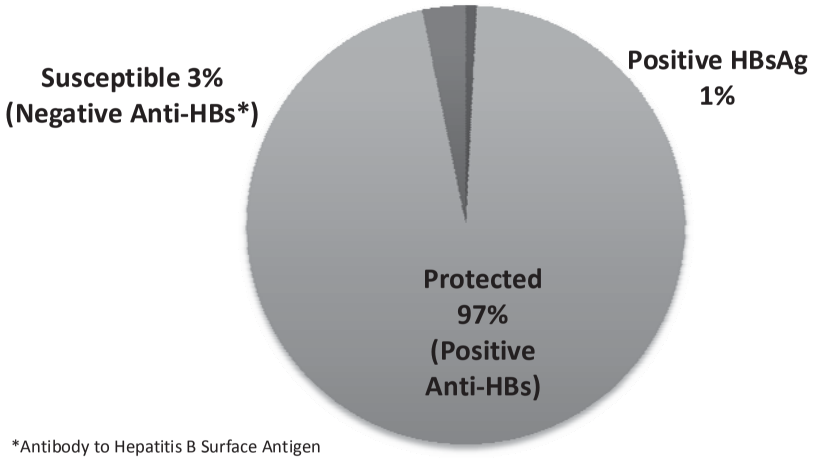


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2010 (N=669)



Note: As of the date of this report, many infants born in the later part of 2010 are not due to receive the 3rd dose hepatitis B vaccine.

Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology (PVS) Results LAC, 2010 (N=124)



*Antibody to Hepatitis B Surface Antigen
Note: As of the date of this report, many infants born in the later part of 2010 are not eligible for PVS testing. PVS testing is recommended at 9-18 months of age after completion of at least 3 doses of hepatitis B vaccine.

Figure 7. Perinatal Hepatitis B Household & Sexual Contacts Age Range, LAC, 2010 (N=890)

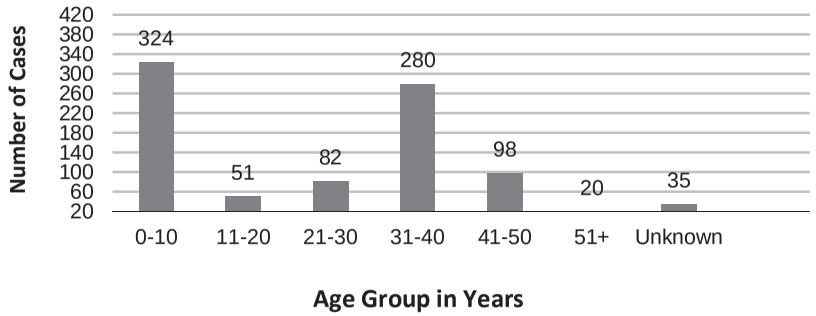
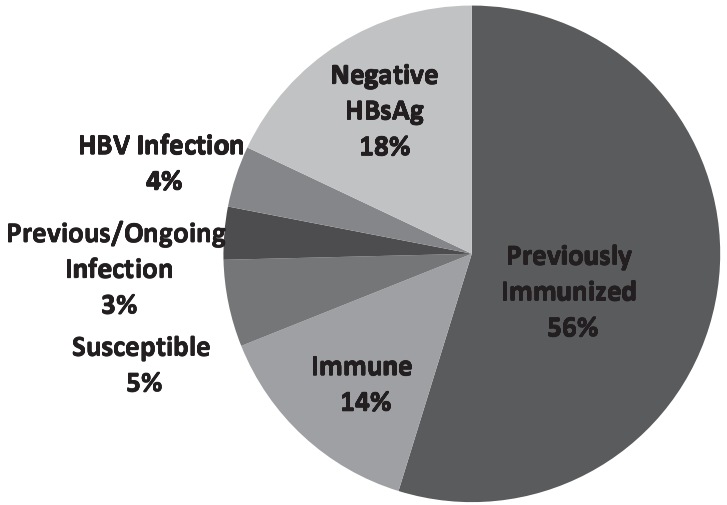


Figure 8. Hepatitis B Status of Household Contacts LAC, 2010 (N=887)



HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	41
Annual Incidence[a]	
LA County	0.42
California[b]	0.83
United States[b]	1.34
Age at Diagnosis	
Mean	44
Median	45
Range	24-68 years

[a] Cases per 100,000 population

[b] Calculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Hepatitis B is a vaccine-preventable viral disease transmitted through parenteral or mucous membrane exposure (via sex or drugs) to the blood and other bodily fluids of individuals infected with the hepatitis B virus (HBV), a DNA-virus of the Hepadnaviridae family. It is also spread from mother to child at birth or soon after birth. Symptoms, which occur in less than half of those acutely infected, may be very mild and flu-like: anorexia, nausea, fatigue, abdominal pain, muscle or joint aches, jaundice and mild fever. Approximately 2–10% of adults infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

For the purpose of surveillance, ACDC uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

The absence of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in LAC. This strategy includes: preventing perinatal HBV transmission by screening all pregnant women for HBsAg and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years. In addition, in LAC, hepatitis B vaccine is provided to high-risk groups at the Public Health Clinics at no charge.

New strategies are needed to reduce high-risk behaviors and provide resources for low-cost hepatitis B immunization, particularly for adults with the highest rates of transmission. Development and implementation of such strategies are possible through collaboration between public health, community-based organizations, and other agencies that serve target populations. Additionally, hepatitis education aims to eliminate, reduce, or mitigate high-risk behaviors in sexually active adults and those who use injection drugs; and to increase awareness and knowledge in the community.

2009 TRENDS AND HIGHLIGHTS

- The 2009 incidence rate of acute hepatitis B in Los Angeles County (LAC) has decreased from the previous year (0.42 per 100,000 versus 0.68 per 100,000) (Figure 1).
- The 2009 incidence rate of acute hepatitis B in LAC was highest in those between the ages of 45 to 54 years (1.2 per 100,000), followed by the 35 to 44 year age group (0.5 per 100,000) (Figure 2).
- The male-to-female ratio was 2.7:1.
- The 2009 incidence rate of acute hepatitis B in LAC was highest in blacks (1.3 per 100,000) followed by Asians (0.4 per 100,000), whites (0.4 per 100,000) and Hispanics (0.3 per 100,000) (Figure 3).
- Of the eight Service Planning Areas (SPAs), two SPAs in 2009 had rates greater than the overall county mean rate (0.42)--SPA 4 (1.0 per 100,000) and SPA 6 (1.0 per 100,000) (Figure 4),
- Risk factors were identified in 75% (n=24) of the 32 confirmed cases interviewed by a public health nurse (including some cases with multiple risk factors). Of those with identified risk factors, the most common were having multiple sexual partners (n=11, 46%) followed by MSM (n=9, 38%), and recent dental work (n=5, 21%) (Figure 5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2005-2009

	2005 (N=57)			2006 (N=62)			2007 (N=55)			2008 (N=66)			2009 (N=41)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
1-4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0	0
15-34	18	31.6	0.6	20	32.3	0.7	9	16.4	0.3	18	27.3	0.6	12	29.3	0.4
35-44	21	36.8	1.4	21	33.9	1.4	21	38.2	1.4	14	21.2	0.9	7	17.1	0.5
45-54	10	17.5	0.8	15	24.2	1.2	12	21.8	0.9	13	19.7	1.0	16	39.0	1.2
55-64	2	3.5	0.2	3	4.8	0.3	3	5.5	0.3	14	21.2	1.5	4	9.7	0.4
65+	6	10.5	0.6	3	4.8	0.3	9	16.4	0.9	7	10.6	0.7	2	4.9	0.2
Unknown	0	0.0		0	0.0		1	1.8		0	0.0		0	0	
Race/Ethnicity															
Asian	8	14.0	0.6	10	16.1	0.8	7	12.7	0.5	7	10.6	0.5	5	12.2	0.4
Black	12	21.1	1.4	4	6.5	0.5	11	20.0	1.3	15	22.7	1.8	11	26.8	1.3
Hispanic	19	33.3	0.4	26	41.9	0.6	16	29.1	0.3	16	24.2	0.3	12	29.3	0.3
White	16	28.1	0.6	21	33.9	0.7	19	34.5	0.7	22	33.3	0.8	11	26.8	0.4
Other	0	0.0	0.0	0	0.0	0.0	2	3.6	9.6	1	1.5	4.1	0	0	0
Unknown	2	3.5		1	1.6		0	0.0		5	7.6		2	4.9	
SPA															
1	1	1.8	0.3	2	3.2	0.6	1	1.8	0.3	2	3.0	0.5	0	0	0
2	10	17.5	0.5	15	24.2	0.7	13	23.6	0.6	9	13.6	0.4	4	9.8	0.2
3	4	7.0	0.2	6	9.7	0.3	4	7.3	0.2	6	9.1	0.3	6	14.6	0.3
4	14	24.6	1.1	16	25.8	1.3	14	25.5	1.1	7	10.6	0.5	13	31.7	1.0
5	5	8.8	0.8	3	4.8	0.5	5	9.1	0.8	9	13.6	1.4	1	2.4	0.2
6	7	12.3	0.7	6	9.7	0.6	9	16.4	0.9	22	33.3	2.1	10	24.4	1.0
7	8	14.0	0.6	6	9.7	0.4	4	7.3	0.3	6	9.1	0.4	2	4.9	0.1
8	8	14.0	0.7	6	9.7	0.5	5	9.1	0.4	4	6.1	0.4	4	9.8	0.4
Unknown	0	0.0		2	3.2		0	0.0		1	1.5		1	2.4	

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

Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 1999-2009

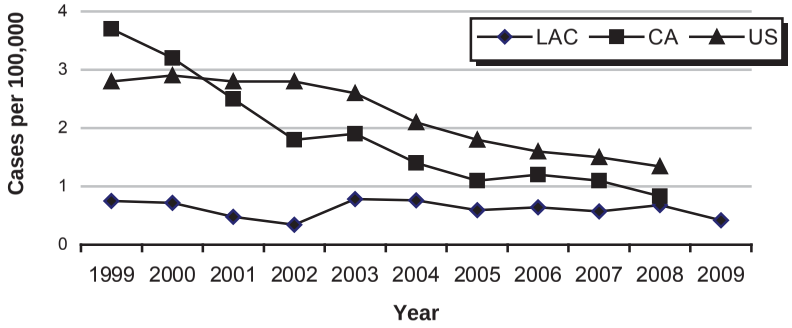
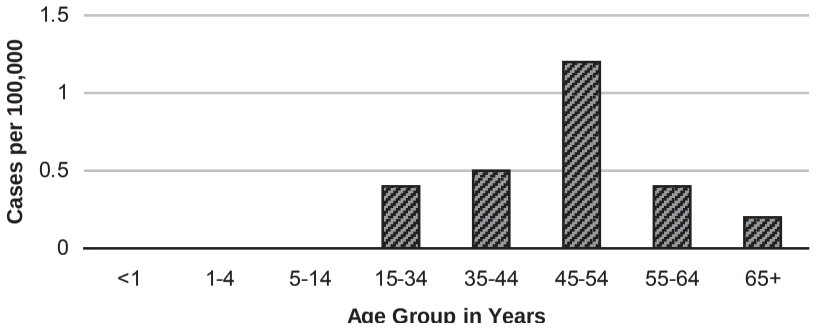


Figure 2. Incidence Rates of Acute Hepatitis B by Age Group
LAC, 2009 (N=41)



* Rates bases on fewer than 20 cases are unreliable

Figure 3. Acute Hepatitis B Incidence Rates by Race/Ethnicity
LAC, 2005-2009

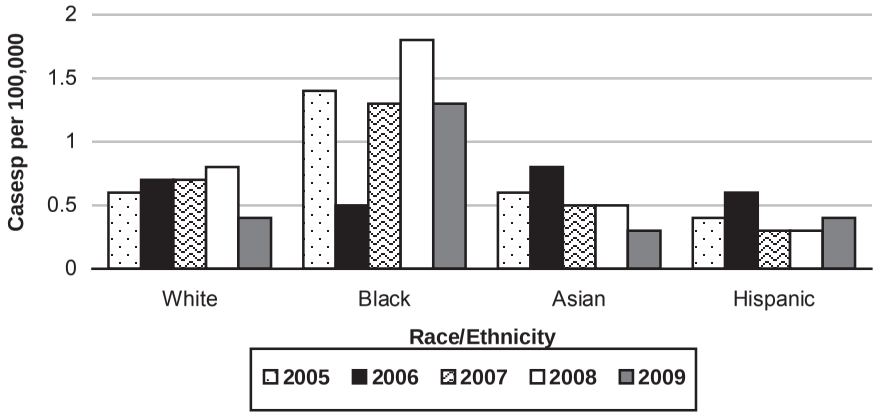


Figure 4. Incidence Rates of Acute Hepatitis B by SPA
LAC, 2009 (N=41)

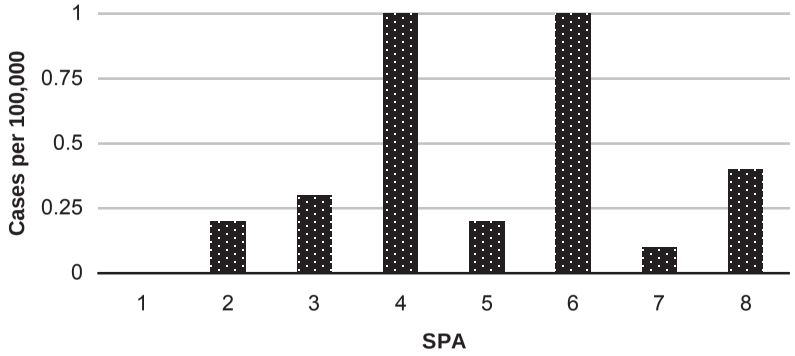
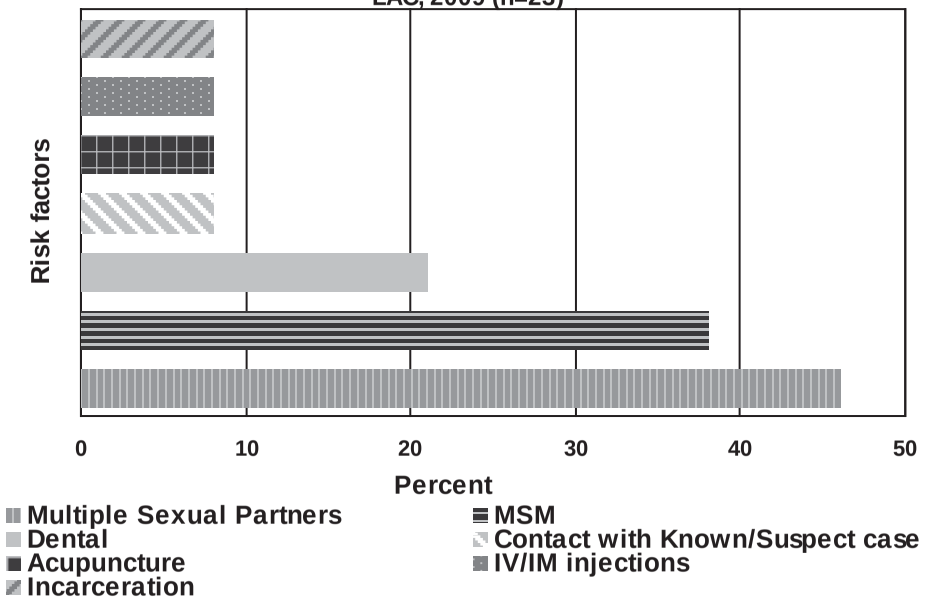


Fig. 5. Hepatitis B Reported Risk Factors*
LAC, 2009 (n=23)



*Includes cases with multiple risk factors

HEPATITIS B, PERINATAL

CRUDE DATA	
Infants Born to HBsAg+ Mothers	773
HBsAg+ Infants	2
Incidence of Exposure[a]	
LA County	5.6
Maternal Age at Diagnosis	
Mean 31.6	years
Median 32	years
Range 15-46	years
Infant Age at Diagnosis	
Mean 12.5	months
Median 12.5	months
Range 12-13	months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2008.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during birth. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a 3-dose vaccine series, has been demonstrated to be 85 to 95% effective in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e- antigen. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Program (PHBPP) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure for greater than one year (often limited to nuclear family).

2009 TRENDS AND HIGHLIGHTS

- In 2009, 773 infants (including 13 twins) were born to 760 HBsAg+ women.
- In 2009, the incidence of exposure increased by 8% from 5.2 to 5.6 per 1000 infants born in 2008 (Figure 1).
- Over 68.4% (n=520) of women screened for HBsAg were between 15 and 34 years of age.
- As consistent with previous years, in 2009, the majority of HBsAg + women were Asian (n=557, 73.3%) followed by white (n=110, 14.5%), Other unknown (n=44, 5.8%), black (n=35, 4.6%), and Pacific Islanders (n=14, 1.8%) (Figures 2 and 3).
- The majority of HBsAg + women reside in Service Planning Area (SPA) 3 (n=355, 46.7%), which has a large Asian population (Figure 4).
- The majority of infants received the first dose of Hepatitis B vaccine and HBIG within 12 hours of birth (Figure 5).
- In 2009, 15.9 % (n=123) of infants born to HBsAg+ women received post-vaccination serology (PVS) testing to determine immunity to hepatitis B after receipt of one dose of HBIG and completion of the three dose hepatitis B vaccination series. PVS results for two infants were HBsAg +, indicating infection (Figure 6).
- The majority of HHCs 39 % were among the age groups 0-10 years (n=438) and 31-40 years (n=326, 29%) (Figure 7).
- Of the household contacts screened (n=175, 16%), 6 % (n=11) were infected, 69% (n=120), were immune, and 25% (n =44) were susceptible to hepatitis B. The Hepatitis B vaccine series was recommended for those who were susceptible (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Maternal Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2005-2009

	2005 (N=762)			2006 (N=803)			2007 (N=774)			2008 (N=778)			2009 (N=760)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	0	0.0	0.0	0	0.0	0.0	1	0.1	0.1	0	0.0	0.0	0	0.0	0.0
15-34	572	75.1	20.4	613	76.3	22.0	567	73.3	20.1	550	70.7	19.2	520	58.4	18.4
35-44	187	24.5	12.4	190	23.7	12.6	206	26.6	13.7	225	28.9	14.9	237	31.2	10.7
45-54	3	0.4	0.2	0	0.0	0.0	0	0.0	0.0	3	0.4	0.2	3	0.4	0.2
55-64	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
65+	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	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Race / Ethnicity															
Asian	619	81.2	49.2	627	78.1	49.3	636	82.2	49.5	611	78.5	46.9	570	75.0	43.8
Black	35	4.6	4.1	30	3.7	3.6	28	3.6	3.3	32	4.1	3.7	33	4.0	3.9
Hispanic	70	9.2	1.5	90	11.2	1.9	70	9.0	1.5	71	9.1	1.5	76	10.0	1.6
White	35	4.6	1.2	51	6.4	1.8	29	3.7	1.0	30	3.9	1.0	40	5.0	1.4
Other	3	0.4	10.6	4	0.5	14.0	11	1.4	52.8	34	4.4	137	41	5.0	1.6
Unknown	0	0.0		1	0.1		0	0.0		0	0.0		0	0.0	
SPA															
1	8	1.0	2.3	6	0.7	1.7	8	1.0	2.2	4	0.5	1.1	6	0.8	1.6
2	100	13.1	4.7	99	12.3	4.6	100	12.9	4.6	96	12.3	4.4	117	15.4	5.3
3	361	47.4	21.1	396	49.3	23.0	392	50.6	22.7	394	50.6	22.7	355	46.7	20.5
4	81	10.6	6.5	97	12.1	7.7	88	11.4	7.0	96	12.3	7.5	83	10.9	6.7
5	36	4.7	5.7	37	4.6	5.8	33	4.3	5.2	37	4.8	5.7	32	4.2	4.9
6	38	5.0	3.7	41	5.1	3.9	33	4.3	3.2	43	5.5	4.1	38	5.0	3.6
7	62	8.1	4.5	58	7.2	4.2	54	7.0	3.9	55	7.1	4.0	50	6.6	3.6
8	76	10.0	6.9	56	7.0	5.0	66	8.5	5.9	50	6.4	4.4	75	9.9	6.7
Unknown	0	0.0		13	1.6		0	0.0		3	0.4		4	0.5	

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

**Figure 1. Perinatal Hepatitis B Incidence of Exposure
LAC, 1999-2009**

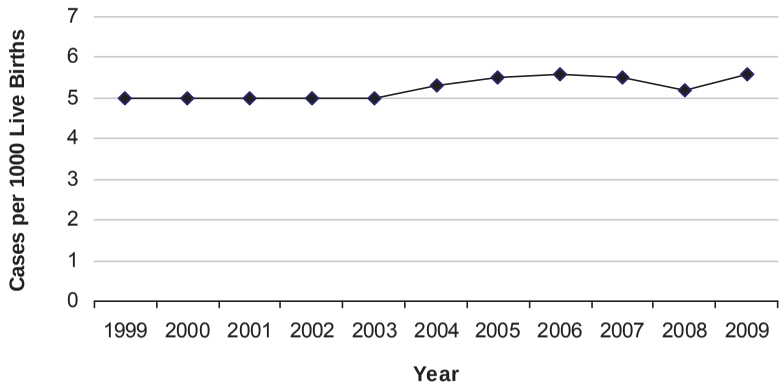
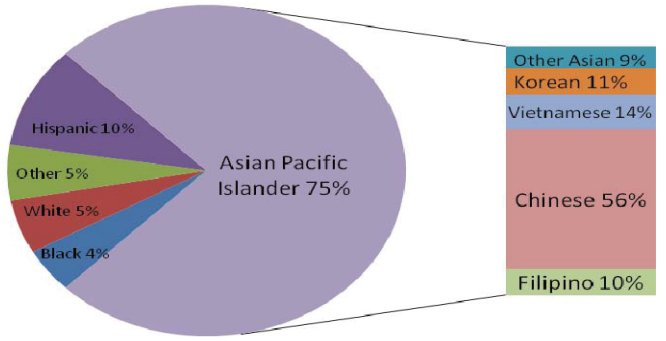


**Figure 2.
Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2009 (N=760)**



Other includes Native- American and any racial group that cannot be categorized as Asian, Black, Hispanic, and White or unknown. Other Asian is Asian-Indian, Cambodian non-Hmong, Thai, Lao, other Pacific Islander or unknown Asian.

**Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2004-2009 (N=4610)**

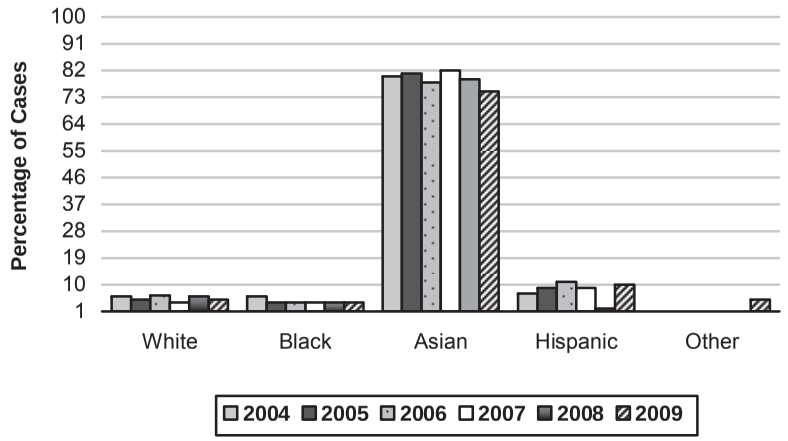


**Figure 4. Perinatal Hepatitis B Maternal by SPA
LAC, 2009 (N=760)**

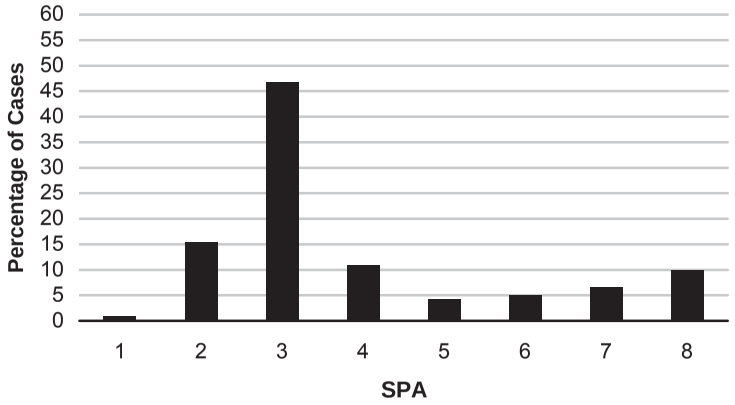


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2009 (N=773)

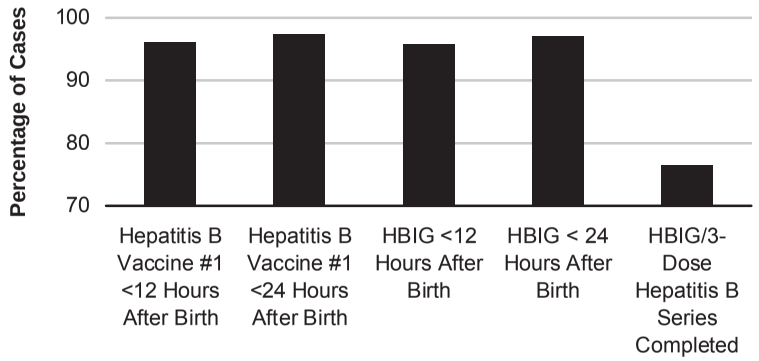
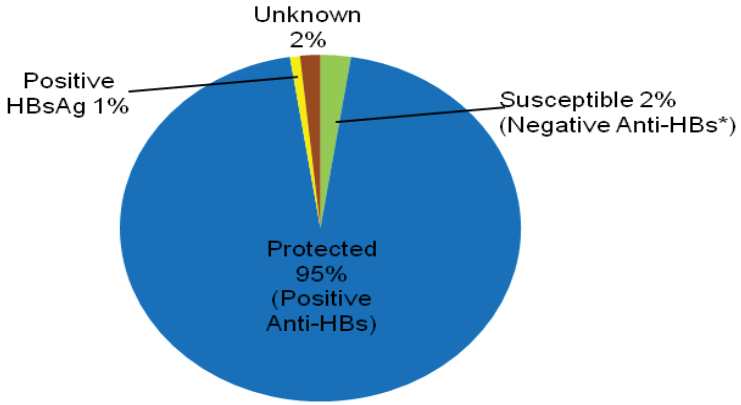


Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology Results LAC, 2009 (N=123)



*Antibody to Hepatitis B Surface Antigen

Figure 7. Perinatal Hepatitis B Household and Sexual Contacts Age Range, LAC, 2009 (N=1126)

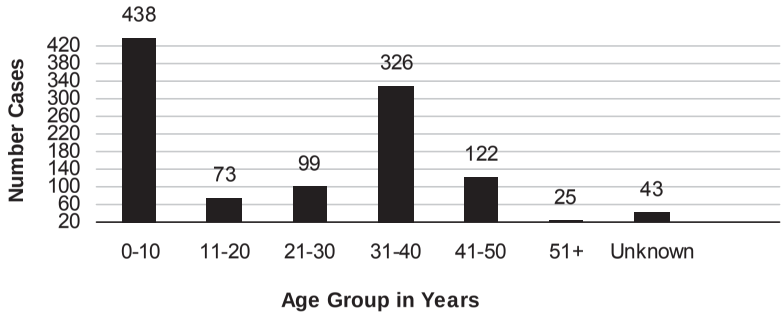
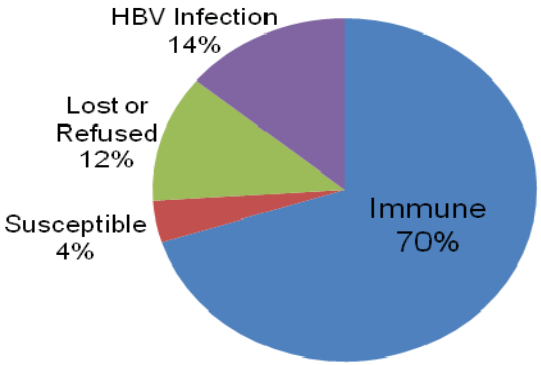


Figure 8. Hepatitis B Status of Household Contacts LAC, 2009 (N=1126)



HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	66
Annual Incidence[a]	
LA County	0.68
California[b]	0.83
United States[b]	1.34
Age at Diagnosis	
Mean	46
Median	45
Range	23-83 years

[a] Cases per 100,000 population

[b] Calculated from Final 2008 Reports of Nationally Notifiable Infectious Disease. MMWR 58(31);856-857;859-869.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure (via sex or drugs) to the blood and other bodily fluids of individuals infected with the hepatitis B virus (HBV), a DNA-virus of the Hepadnaviridae family. It is also spread from mother to child at birth or soon after birth. Symptoms, which occur in less than half of those acutely infected, may be very mild and flu-like: anorexia, nausea, fatigue, abdominal pain, muscle or joint aches, jaundice and mild fever. Approximately 2–10% of adults infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

For the purpose of surveillance, ACDC uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 2) jaundice *or* elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

The absence of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in LAC. This strategy includes: preventing perinatal HBV transmission by screening all pregnant women for HBsAg and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years. In addition, in LAC, hepatitis B vaccine is provided to high-risk groups at the Public Health Clinics at no charge.

New strategies are needed to reduce high-risk behaviors and provide resources for low-cost hepatitis B immunization, particularly for adults with the highest rates of transmission. Development and implementation of such strategies is possible through collaboration between public health, community-based organizations, and other agencies that serve target populations. Additionally, promoting hepatitis health education aims at eliminating, reducing, or mitigating high-risk behaviors in sexually active adults and increasing awareness and knowledge in the community.

2008 TRENDS AND HIGHLIGHTS

- The 2008 incidence rate of acute hepatitis B in Los Angeles County (LAC) has increased slightly from the previous year (0.68 per 100,000 versus 0.57 per 100,000) (Figure 1).
- ACDC investigated one outbreak in a Long-Term Care Facility (LTCF) (See 2008 Special Studies Report for more information).
- The 2008 incidence rate of acute hepatitis B in LAC was highest in those between the ages of 55 to 64 years (1.5 per 100,000), followed by the 45 to 54 year age group (1.0 per 100,000) and the 35 to 44 year age group (0.9 per 100,000) (Figure 2).
- The male-to-female ratio was 4:1.
- The 2008 incident rate of acute hepatitis B in LAC was highest in blacks (1.8 per 100,000) followed by whites (0.8 per 100,000), Asians (0.5 per 100,000) and Hispanics (0.3 per 100,000) (Figure 3).
- Of the eight Service Planning Areas (SPAs) across LAC, SPA 6 had the highest incidence rate (2.1 per 100,000); however, SPA 6 had 8 cases of acute hepatitis B associated with the outbreak investigation in a LTCF (Figure 4).
- Risk factors were identified in 66% (n=31) of the 47 confirmed cases interviewed by a public health nurse which were not associated with the outbreak in the LTCF (including some cases with multiple risk factors). Of those with identified risk factors, recent dental work (n=13, 42%) was the most common risk factor reported followed by having multiple sexual partners (n=10, 32%), contact with a person with a confirmed or suspected acute or chronic Hepatitis B infection (n=7, 23%), receiving fingersticks (n=5, 16%), and receiving a tattoo (n=5, 16%) (Figure 5).

Reported Hepatitis B, Acute, (Nonperinatal) Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008

	2004 (N=72)			2005 (N=57)			2006 (N=62)			2007 (N=55)			2008 (N=66)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	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
15-34	29	40.3	1.0	18	31.6	0.6	20	32.3	0.7	9	16.4	0.3	18	27.3	0.6
35-44	18	25.0	1.2	21	36.8	1.4	21	33.9	1.4	21	38.2	1.4	14	21.2	0.9
45-54	9	12.5	0.7	10	17.5	0.8	15	24.2	1.2	12	21.8	0.9	13	19.7	1.0
55-64	10	13.9	1.3	2	3.5	0.2	3	4.8	0.3	3	5.5	0.3	14	21.2	1.5
65+	6	8.3	0.6	6	10.5	0.6	3	4.8	0.3	9	16.4	0.9	7	10.6	0.7
Unknown	0	0.0		0	0.0		0	0.0		1	1.8		0	0.0	
Race / Ethnicity															
Asian	12	16.7	1.0	8	14.0	0.6	10	16.1	0.8	7	12.7	0.5	7	10.6	0.5
Black	12	16.7	1.4	12	21.1	1.4	4	6.5	0.5	11	20.0	1.3	15	22.7	1.8
Hispanic	23	31.9	0.5	19	33.3	0.4	26	41.9	0.6	16	29.1	0.3	16	24.2	0.3
White	24	33.3	0.8	16	28.1	0.6	21	33.9	0.7	19	34.5	0.7	22	33.3	0.8
Other	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	2	3.6	9.6	1	1.5	4.1
Unknown	1	1.4		2	3.5		1	1.6		0	0.0		5	7.6	
SPA															
1	0	0.0	0.0	1	1.8	0.3	2	3.2	0.6	1	1.8	0.3	2	3.0	0.5
2	19	26.4	0.9	10	17.5	0.5	15	24.2	0.7	13	23.6	0.6	9	13.6	0.4
3	11	15.3	0.6	4	7.0	0.2	6	9.7	0.3	4	7.3	0.2	6	9.1	0.3
4	14	19.4	1.1	14	24.6	1.1	16	25.8	1.3	14	25.5	1.1	7	10.6	0.5
5	7	9.7	1.1	5	8.8	0.8	3	4.8	0.5	5	9.1	0.8	9	13.6	1.4
6	6	8.3	0.6	7	12.3	0.7	6	9.7	0.6	9	16.4	0.9	22	33.3	2.1
7	7	9.7	0.5	8	14.0	0.6	6	9.7	0.4	4	7.3	0.3	6	9.1	0.4
8	8	11.1	0.7	8	14.0	0.7	6	9.7	0.5	5	9.1	0.4	4	6.1	0.4
Unknown	0	0.0		0	0.0		2	3.2		0	0.0		1	1.5	

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

**Figure 1. Incidence Rates of Acute Hepatitis B
LAC, CA and US, 1999-2008**

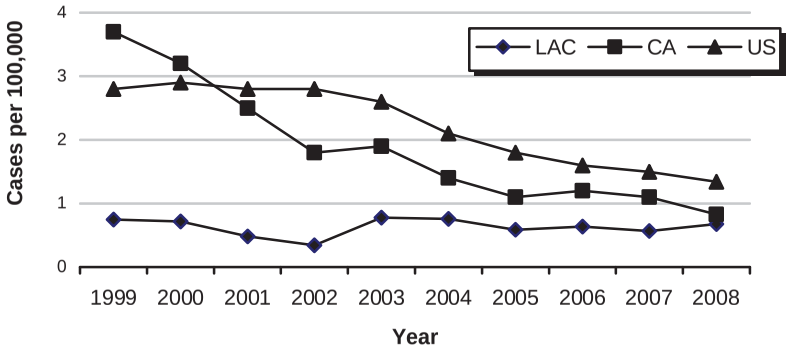
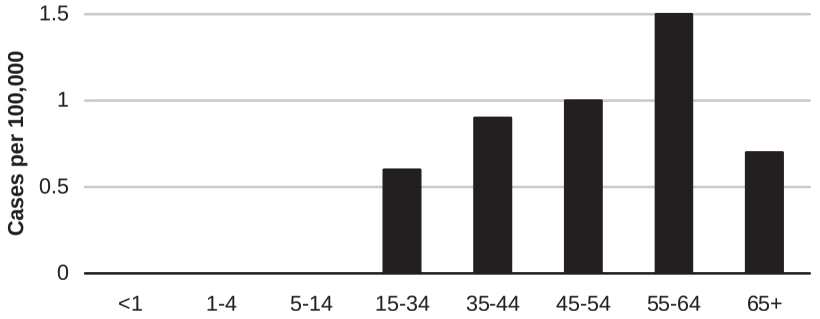


**Figure 2. Incidence Rates of Acute Hepatitis B by Age Group
LAC, 2008**



* Rates bases on fewer than 20 cases are unreliable

**Figure 3. Acute Hepatitis B Incidence by Race/Ethnicity
LAC, 2004-2008**

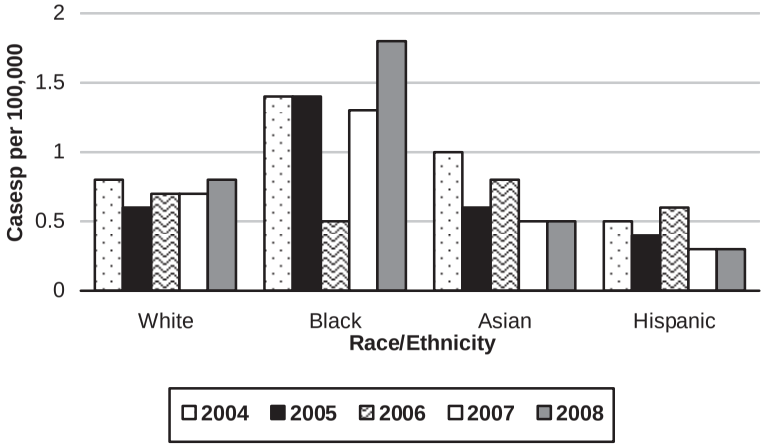


**Figure 4. Incidence Rates of Acute Hepatitis B by SPA
LAC, 2008**

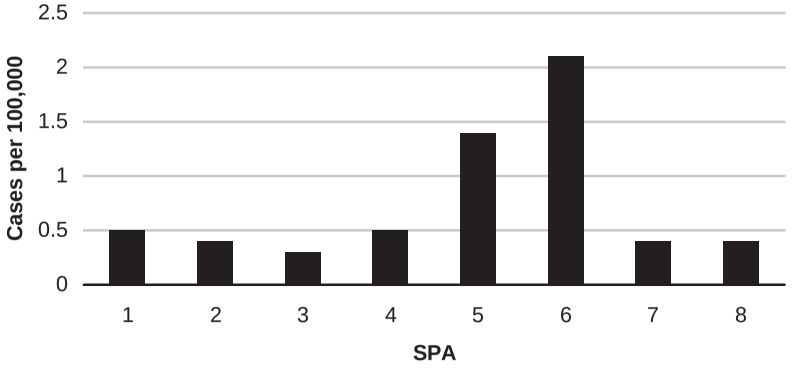
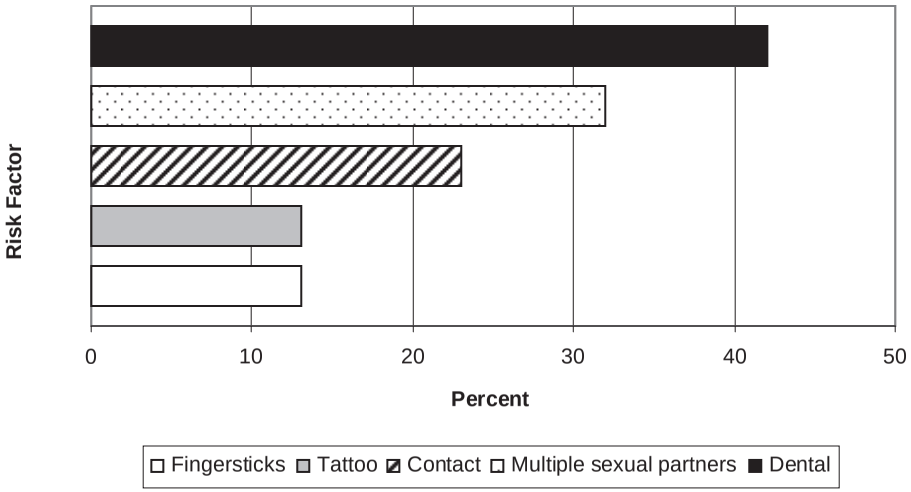
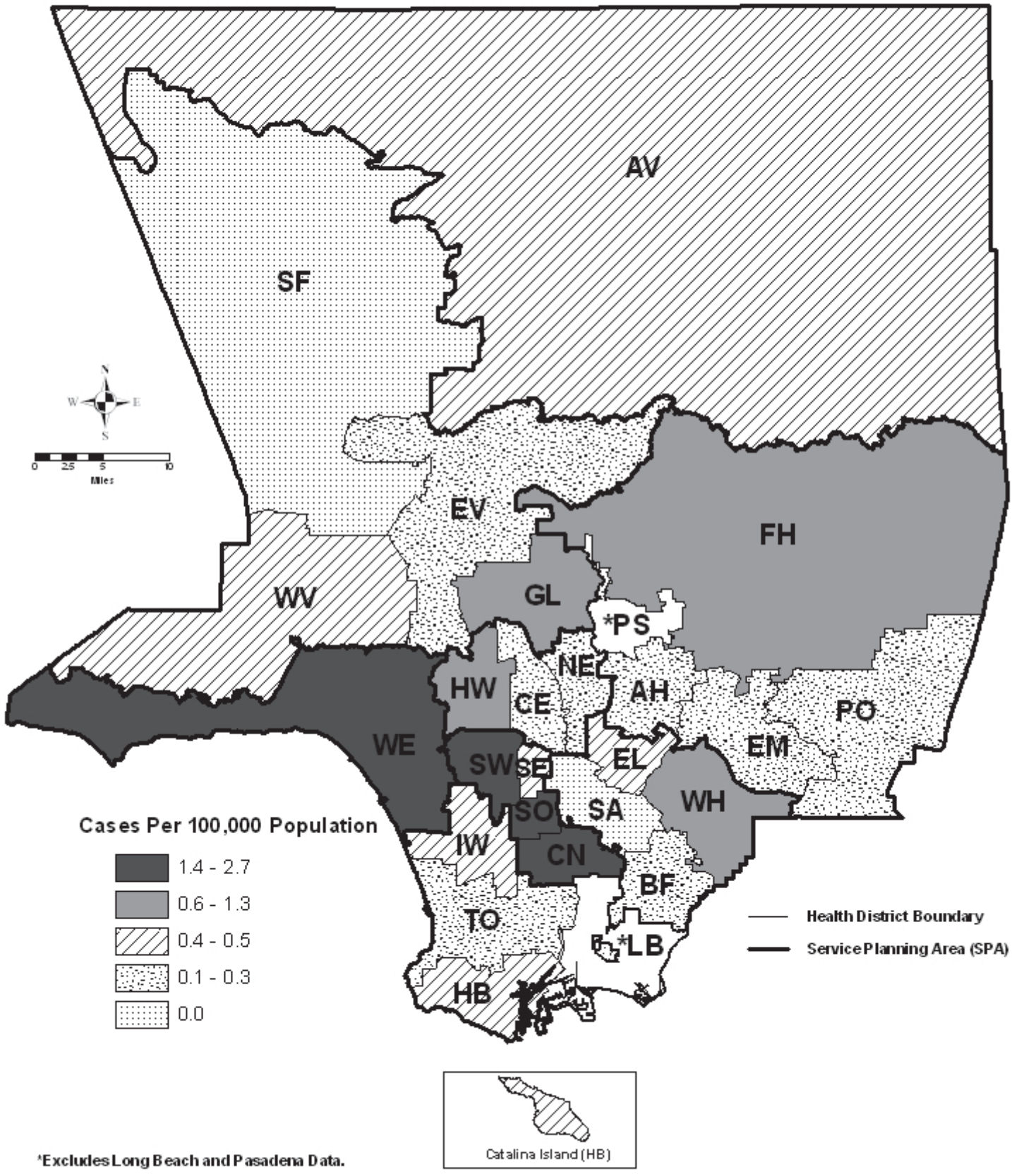


**Figure 5. Hepatitis B Reported Risk Factors*
LAC, 2008 (n=31)**



*Includes cases identifying multiple risk factors

Map 7. Hepatitis B
Rates by Health District, Los Angeles County, 2008*



*Excludes Long Beach and Pasadena Data.

HEPATITIS B, PERINATAL

CRUDE DATA	
Number of Infants Born to HBsAg Positive Mothers	792
Incidence of Exposure[a]	
LA County	5.2
Maternal Age at Diagnosis	
Mean	32 years
Median	31 years
Range	17-46 years
Infant Age at Diagnosis	
Mean	9.75 months
Median	10 months
Range	8-11 months

[a]Number of infants born to HBsAg-positive mothers per 1000 live births in 2008.

DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during birth. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12 to 24 hours after birth, followed by completion of a 3-dose vaccine series, has been demonstrated to be 85 to 95% effective in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic (PVS) testing is recommended at age 9–18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Program (PHBPP) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, and household and sexual contacts (SC). Household contacts (HHC) are defined as an individual(s) with anticipated continuous household exposure for greater than one year (often limited to nuclear family).

2008 TRENDS AND HIGHLIGHTS

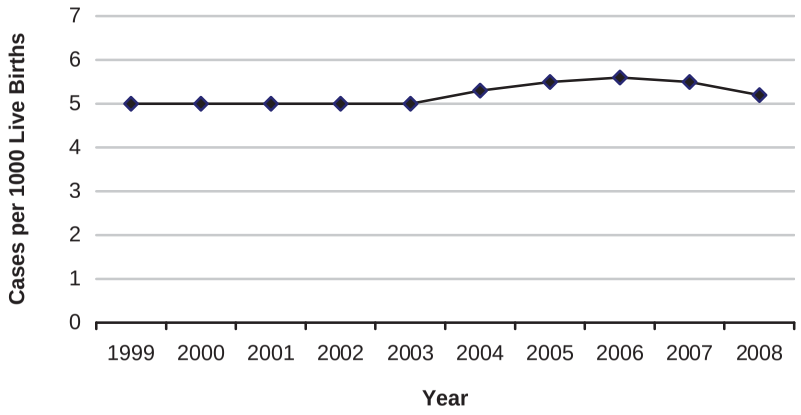
- In 2008, 792 infants (including 14 twins) were born to 778 HBsAg+ women.
- In 2008, the incidence of exposure decreased by 5% from 5.5 to 5.2 per 1000 infants born in 2007 (Figure 1).
- Over 70% (n=550) of women screened for HBsAg were between 15 and 34 years of age.
- As consistent with previous years, in 2008, the majority of HBsAg+ women were Asian/Pacific Islanders (API) (n=611, 79%), followed by Hispanic (n=71, 9%), black (n=32, 4%), and white (n=30, 4%), and (Figures 2 and 3).
- The majority of HBsAg+ women reside in Service Planning Area (SPA) 3 (n=394, 51%), which has a large Asian constituency (Figure 4).
- The majority of infants received the first dose of Hepatitis B vaccine and HBIG within 12 hours of birth (Figure 5).
- Fourteen percent (n=111) of infants born in 2008 have been screened for PVS. PVS results for 4 infants were HBsAg positive in 2008. PVS testing of infants born in 2008 is still in progress (Figure 6).
- The majority of HHCs were among the age groups 0-10 years (n=434, 38%) and 31-40 years (n=375, 33%) (Figure 7).
- Thirty-five percent of HHCs screened had a negative HBsAg, a negative antibody to HBsAg (anti-HBs) and a negative antibody to hepatitis B core antigen (anti-HBc), which suggests susceptibility to the hepatitis B virus. The Hepatitis B vaccine series was recommended (Figure 8).

Reported Hepatitis B, Perinatal Cases and Rates* per 100,000 by Age Group, Race/Ethnicity, and SPA
Los Angeles County, 2004-2008

	2004 (N=733)			2005 (N=762)			2006 (N=803)			2007 (N=774)			2008 (N=778)		
	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000	No.	(%)	Rate/ 100,000
Age Group															
<1	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
1-4	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
5-14	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	1	0.1	0.1	0	0.0	0.0
15-34	558	76.1	19.8	572	75.1	20.4	613	76.3	22.0	567	73.3	20.1	550	70.7	19.2
35-44	172	23.5	11.5	187	24.5	12.4	190	23.7	12.6	206	26.6	13.7	225	28.9	14.9
45-54	3	0.4	0.2	3	0.4	0.2	0	0.0	0.0	0	0.0	0.0	3	0.4	0.2
55-64	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
65+	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	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
Race / Ethnicity															
Asian	585	79.8	47.1	619	81.2	49.2	627	78.1	49.3	636	82.2	49.5	611	78.5	46.9
Black	43	5.9	5.0	35	4.6	4.1	30	3.7	3.6	28	3.6	3.3	32	4.1	3.7
Hispanic	53	7.2	1.2	70	9.2	1.5	90	11.2	1.9	70	9.0	1.5	71	9.1	1.5
White	46	6.3	1.6	35	4.6	1.2	51	6.4	1.8	29	3.7	1.0	30	3.9	1.0
Other	6	0.8	21.6	3	0.4	10.6	4	0.5	14.0	11	1.4	52.8	34	4.4	137.
Unknown	0	0.0		0	0.0		1	0.1		0	0.0		0	0.0	
SPA															
1	12	1.6	3.6	8	1.0	2.3	6	0.7	1.7	8	1.0	2.2	4	0.5	1.1
2	94	12.8	4.4	100	13.1	4.7	99	12.3	4.6	100	12.9	4.6	96	12.3	4.4
3	335	45.8	19.7	361	47.4	21.1	396	49.3	23.0	392	50.6	22.7	394	50.6	22.7
4	101	13.8	8.2	81	10.6	6.5	97	12.1	7.7	88	11.4	7.0	96	12.3	7.5
5	31	4.2	4.9	36	4.7	5.7	37	4.6	5.8	33	4.3	5.2	37	4.8	5.7
6	36	4.9	3.5	38	5.0	3.7	41	5.1	3.9	33	4.3	3.2	43	5.5	4.1
7	49	6.7	3.6	62	8.1	4.5	58	7.2	4.2	54	7.0	3.9	55	7.1	4.0
8	74	10.1	6.7	76	10.0	6.9	56	7.0	5.0	66	8.5	5.9	50	6.4	4.4
Unknown	0	0.0		0	0.0		13	1.6		0	0.0		3	0.4	

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

**Figure 1. Perinatal Hepatitis B Incidence of Exposure
LAC, 1999-2008**



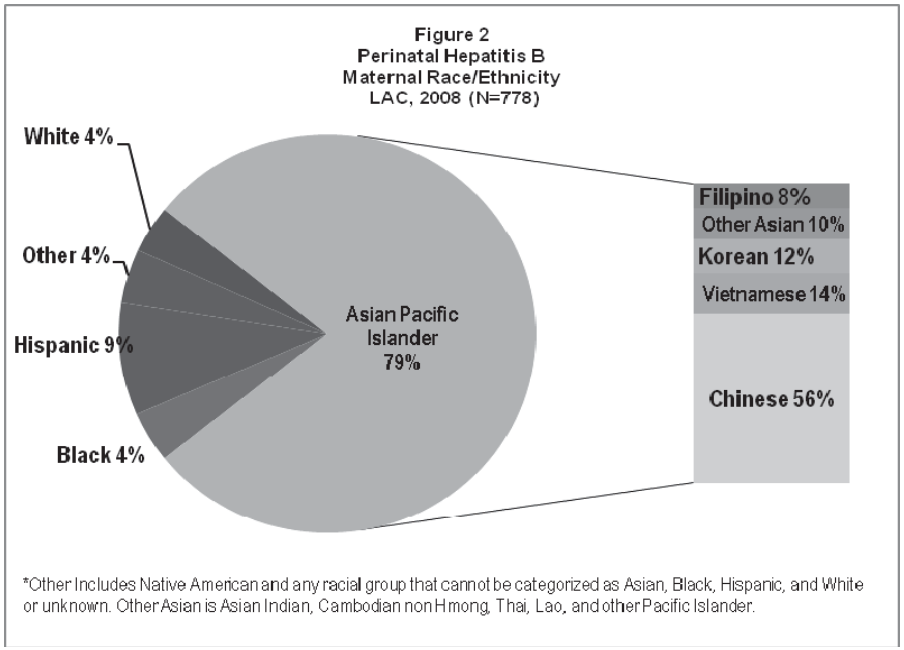


**Figure 3. Perinatal Hepatitis B Maternal Race/Ethnicity
LAC, 2004-2008 (N=3850)**

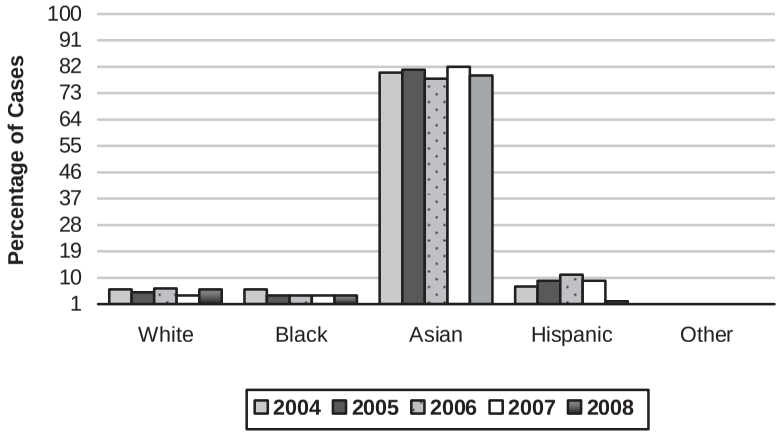


**Figure 4. Perinatal Hepatitis B Maternal by SPA
LAC, 2008 (N=778)**

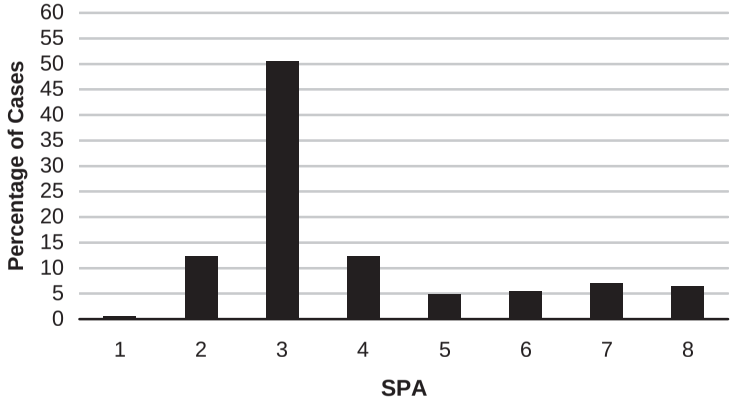


Figure 5. Perinatal Hepatitis B Summary of Infant Hepatitis B Immunoprophylaxis, LAC, 2008 (N=778)

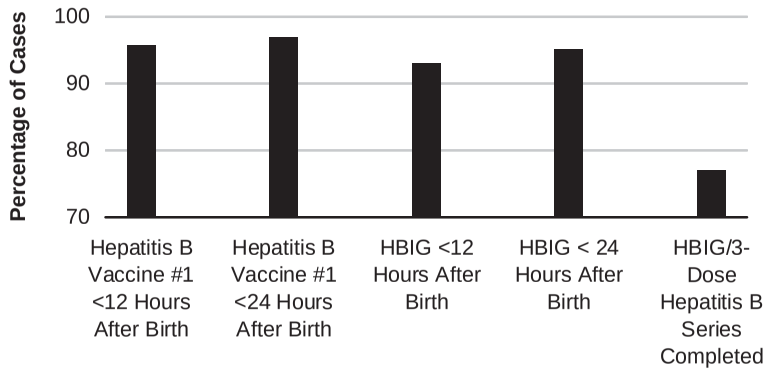
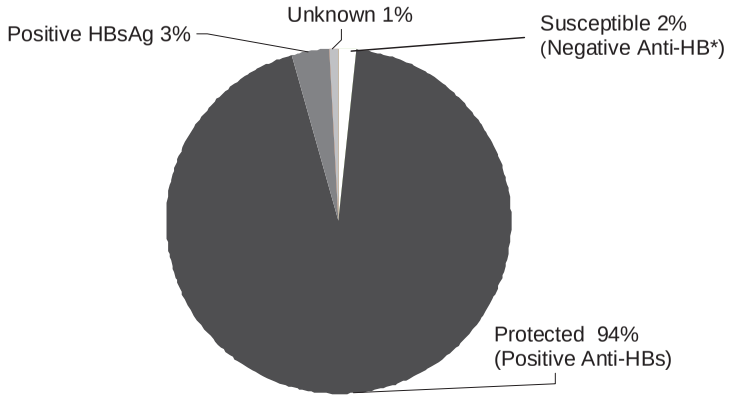


Figure 6. Perinatal Hepatitis B Infant Post Vaccination Serology Results, LAC, 2008 (N=111)



*Antibody to Hepatitis B Surface Antigen

Figure 7. Perinatal Hepatitis B Household and Sexual Contacts Age Range, LAC, 2008 (N=1143)

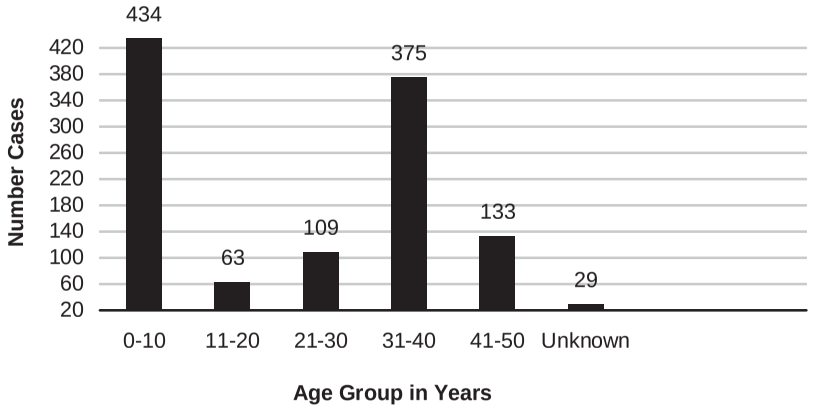
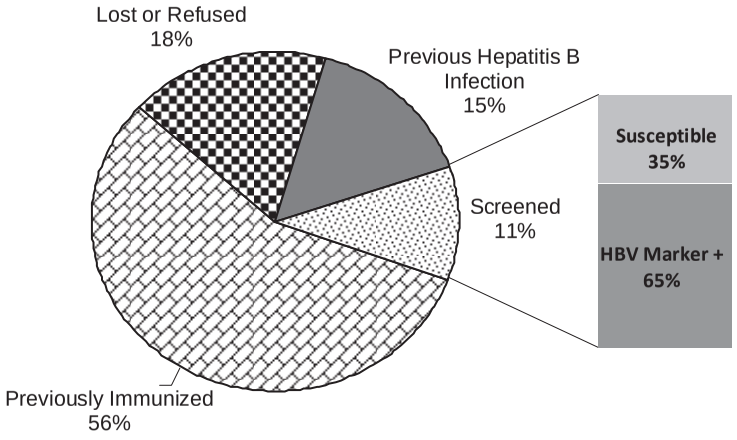


Figure 8. Perinatal Hepatitis B Hepatitis B Virus Marker Status of Household Contacts LAC, 2008 (N=1142)



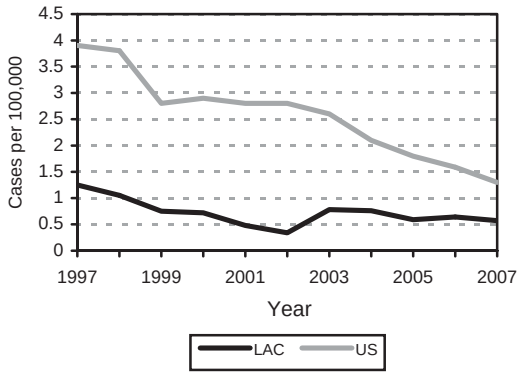
HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	55
Annual Incidence[a]	
Los Angeles	0.57
California	1.04[b]
United States	1.30[b]
Age at Diagnosis	
Mean	47
Median	42
Range	22-87 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issue of MMWR (57:901, 903-913).

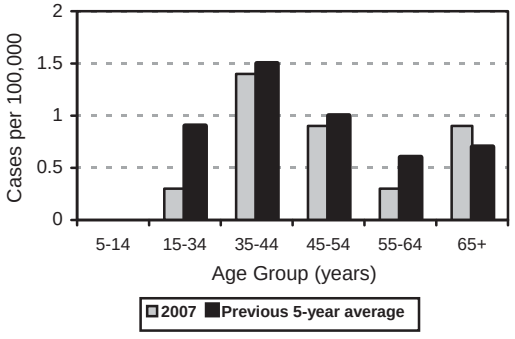
Figure 1
Hepatitis B
Incidence Rates by Year
LAC and US, 1997–2007



DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure (via sex or drugs) to the blood and other bodily fluids of individuals infected with the hepatitis B virus (HBV), a DNA-virus of the Hepadnaviridae family. It is also spread from mother to child at birth or soon after birth. Symptoms, which occur in less than half of those acutely infected, may be very mild and flu-like: anorexia, nausea, fatigue, abdominal pain, muscle or joint aches, jaundice, and mild fever. Approximately 2–10% of non-infants infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

Figure 2
Acute Hepatitis B
Incidence Rate by Age Group
LAC, 2007 (n=55)



* Small numbers in these groups produced unstable rates.

For the purpose of surveillance, ACDC uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms, 2) jaundice or elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

DISEASE ABSTRACT

- The incidence rate for acute hepatitis B decreased slightly from the previous year (0.64 to 0.57 per 100,000) (Figure 1).
- The highest incidence rate occurred in persons aged 35-54 years, and the majority of the cases were males.
- Contact with a person with a confirmed or suspected acute or chronic hepatitis B infection was the most frequently identified risk factor.
- No outbreaks were reported in 2007.

STRATIFIED DATA

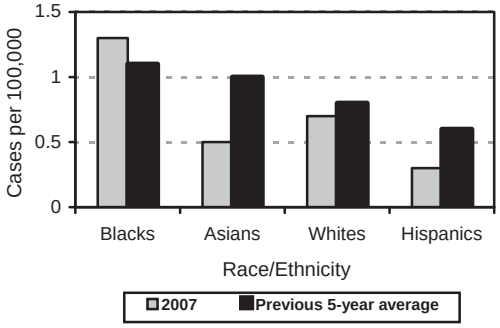
Seasonality: None.

Age: Cases ranged in age from 22 to 87 years (the median age was 42). The highest incidence rate occurred in persons aged 34-54 years (1.4 per 100,000). The incidence rate in the 65+ age group increased from the previous 5-year average (Figure 2).

Sex: The male-to-female rate ratio was 1.75:1.0. The number of cases in males exceeded those of females in all ethnic groups.

Race/Ethnicity: The highest incidence rate was seen in blacks (1.3 per 100,000) followed by whites (0.7 per 100,000), Asians (0.5 per 100,000), and Hispanics (0.3 per 100,000), respectively (Figure 3).

Figure 3
Acute Hepatitis B
Incidence Rates by Race/Ethnicity*
LAC, 2007



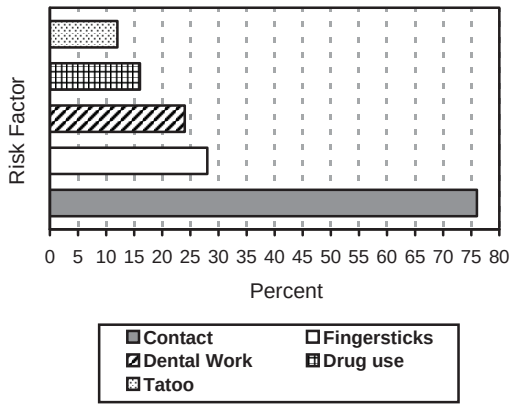
* Excludes perinatal cases.
* Small numbers in these groups produced unstable rates.

Location: Incidence rates by SPA ranged from 0.2 to 1.1 per 100,000. SPA 4 had the highest incidence rate (1.1 per 100,000) followed by SPA 6 (0.9 per 100,000) and SPA 5 (0.8 per 100,000). However, further stratification of cases by SPA produced small numbers and unstable incidence rates.

Severity of Illness: There was one reported hepatitis B related death in 2007. Fifty-seven percent of reported cases were hospitalized. The age range of those hospitalized was 22-87 years. The median age was 41 years.

Risk Factors: Risk factors were identified in 45% (n=25) of confirmed cases (including some cases with multiple risk factors). Of those with risk factors, contact with a person with a confirmed or suspected acute or chronic Hepatitis B infection (n=19, 76%) was the most common risk factor reported, followed by receiving fingersticks (n=7, 28%), recent dental work (n=6, 24%), drug use (n=4, 16%), and tattoo (n=3, 12%) (Figure 4).

Figure 4
Hepatitis B Reported Risk Factors*
LAC, 2007 (n=25)



* Includes cases identifying multiple risks.

COMMENTS

In LAC, there were 315 suspect cases in 2007 that were initially reported to have acute hepatitis B in comparison to the 403 suspects reported for 2006. In both years, the percentage of cases that met the CDC/CSTE criteria for confirmation ranged from 15-17%. Most cases that are not confirmed as meeting the CDC/CSTE criteria are missing documentation of clear evidence of liver involvement (e.g., the liver enzyme levels are normal or missing).

In 2007, all acute hepatitis B cases were aged 15 years or older. The incidence rate was highest in the 35-44 age group (1.4 per 100,000). In comparison to other age groups, the incidence rate increased in those over 65 years of age (0.9 per 100,000). Risk factors were identified in six (67%) out of the nine confirmed cases over 65 years of age (including some cases with multiple risk factors). Of those over 65 years of age with identified risk factors, 100% reported receiving fingersticks in the 6 months prior to the

onset of symptoms. In 2008, Los Angeles County Department of Public Health (LAC DPH) will use an enhanced questionnaire for investigation of persons aged ≥50 yrs confirmed with acute hepatitis B to gather additional risk factor data for these cases including possible health care exposures.

PREVENTION

The absence of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in LAC. This strategy includes: preventing perinatal HBV transmission by screening all pregnant women for HBsAg and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years. In addition, in LAC, hepatitis B vaccine is provided to high-risk groups at the Public Health Clinics at no charge.

New strategies are needed to reduce high-risk behaviors and provide resources for low-cost hepatitis B immunization, particularly for adults with the highest rates of transmission. Development and implementation of such strategies is possible through collaboration between public health, community-based organizations, and other agencies that serve target populations. Additionally, promoting hepatitis health education aims at eliminating, reducing, or mitigating high-risk behaviors in sexually active adults and increasing awareness and knowledge in the community.

ADDITIONAL RESOURCES

Centers for Disease Control and Prevention. Viral Hepatitis B - http://www.cdc.gov/hepatitis/

Hepatitis B Vaccine Information Infants, Children, and Adolescents - http://www.cdc.gov/hepatitis/HBV/VaccChildren.htm

Hepatitis B Vaccine Information Adults - http://www.cdc.gov/hepatitis/HBV/VaccAdults.htm

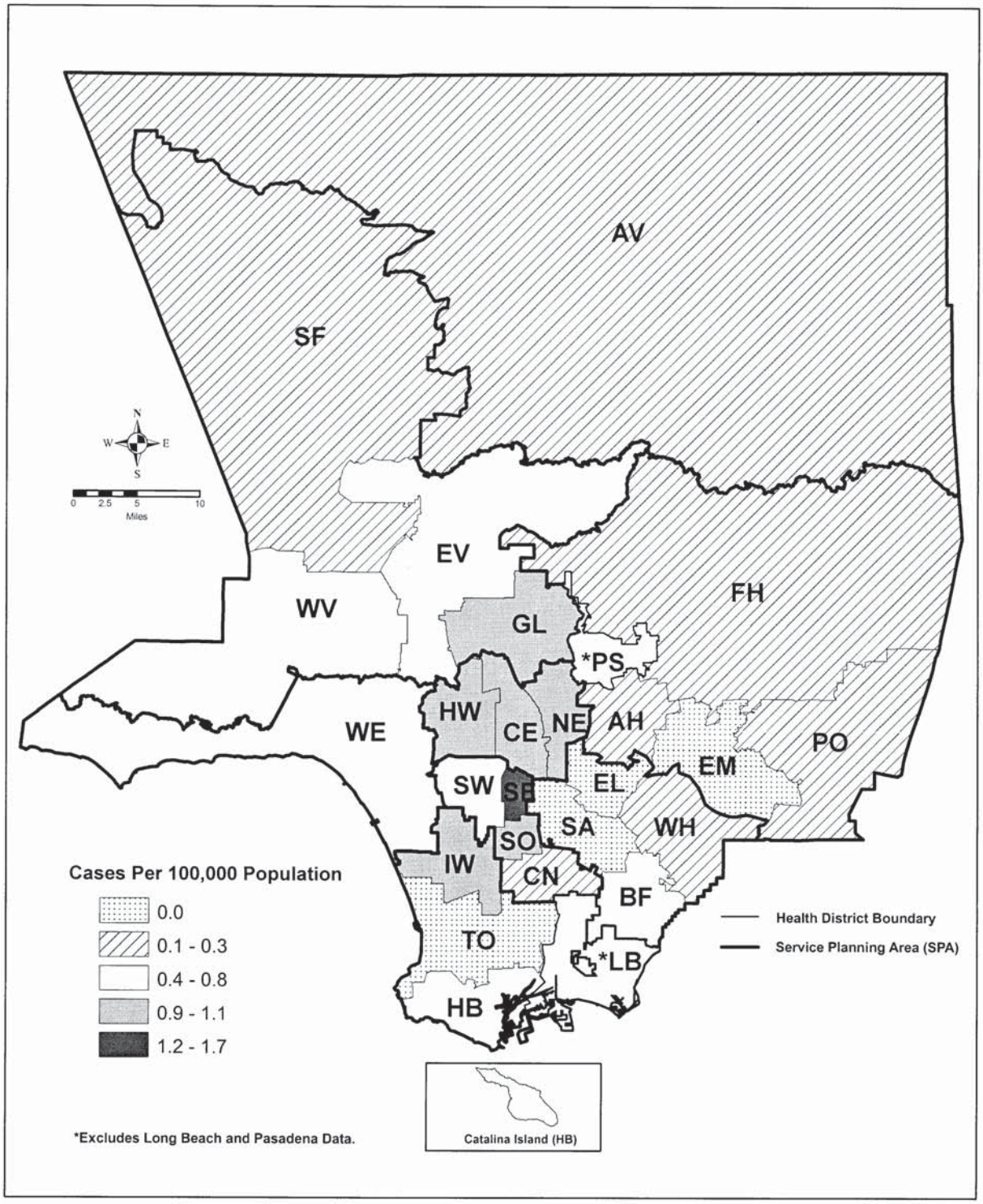
Publications:

Centers for Disease Control and Prevention (2003). Transmission of hepatitis B and C viruses in outpatient settings--New York, Oklahoma, and Nebraska, 2000-2002. *Morbidity and Mortality Weekly Report*, 52(38), 901-906. Retrieved October 31, 2008, from the CDC Web site: www.cdc.gov/mmwr/PDF/wk/mm5238.pdf

Centers for Disease Control and Prevention (2005). Transmission of hepatitis B virus among persons undergoing blood glucose monitoring in long-term care facilities--Mississippi, North Carolina, and Los Angeles County, California, 2003-2004. *Morbidity and Mortality Weekly Report*, 54(9), 220-223. Retrieved October 31, 2008, from the CDC Web site: www.cdc.gov/mmwr/preview/mmwrhtml/mm5409a2.htm

Centers for Disease Control and Prevention (2008). Surveillance for acute viral hepatitis--United States, 2006. *Morbidity and Mortality Weekly Report*, 57(SS02), 1-24. Retrieved October 31, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5702a1.htm

Map 8. Hepatitis B
Rates by Health District, Los Angeles County, 2007*

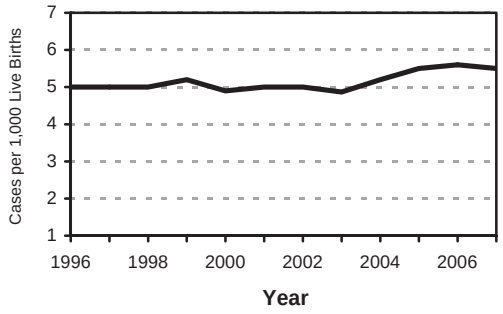


HEPATITIS B, PERINATAL

CRUDE DATA	
Number of Infants Born to HBsAg Positive Mothers	774
Incidence of Exposure[a]	
LA County	5.5
United States	N/A
Age at Diagnosis	
Mean	N/A
Median	N/A
Range	N/A

[a] Number of Infants born to HBsAg-positive mothers per 1,000 live births in 2006.

Figure 1
Perinatal Hepatitis B
Incidence Rates of Infants Born to HBV-Positive Mothers by Year
LAC, 1996–2007



DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during birth. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection by 6 months of age, and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12-24 hours after birth, followed by completion of a 3-dose vaccine series, has been demonstrated to be 85-95% effective in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic testing is recommended at age 9-18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Program (PHBPP) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, household, and sexual contacts.

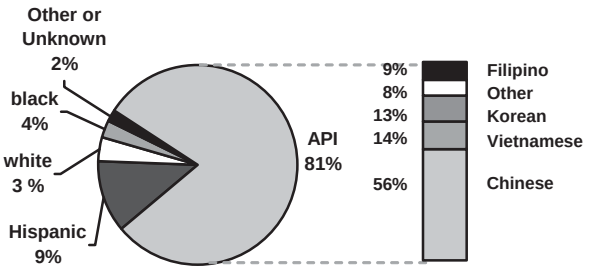
DISEASE ABSTRACT

- The majority of HBsAg-positive women giving birth were born in areas of the world with high or intermediate levels of endemic hepatitis B disease (e.g., Asia, Africa, Eastern Europe, Independent States of the former Soviet Union, Middle East, Pacific Islands, and several Central and South American countries).
- Of infants born to HBsAg-positive mothers, 97% received hepatitis B vaccine and 96% received HBIG within 24 hours of birth.
- Among those infants whose pediatric health care providers responded (n=193, 25%) to a survey after the completion of the full vaccination series, 89% of infants were protected against HBV, 10% were still susceptible, and 1% were infected with HBV.
- The incidence of exposure of infants born to HBsAg-positive mothers decreased by 2% from 5.6 to 5.5 per 1,000 infants born in 2007.

STRATIFIED DATA

Trends: In 2007, 774 infants (including 12 sets of twins) were born to 762 HBsAg-positive women. The incidence of exposure of infants born to HBsAg-positive mothers decreased by 2% from 5.6 to 5.5 per 1,000 infants born in 2007 (Figure 1).

Figure 2
Perinatal Hepatitis B
by Maternal Race/Ethnicity
LAC, 2007 (N=762)



Race/Ethnicity: The majority of the HBsAg-positive women (n=620, 81%) were Asian/Pacific Islanders (API). Other ethnic group identified were Hispanic (9%), white (4%), black (4%), and 2% were classified as other or unknown (Figure 2). Of API women, over half were Chinese (n=349, 56%). The remaining API women included: Vietnamese (n=91, 14%), Korean (n=80, 13%), Filipino (n=53, 9%), and others from various countries (e.g., Cambodia, Thailand, Samoa, Tonga, Japan, Burma, Indonesia; Laos and Mongolia) (n=47, 8%).

Age: The age range of mothers was 14-43 years of age with a median age of 31 years.

Location: The majority of the HBsAg-positive mothers (n=380, 50%) resided in SPA 3, which has a large Asian constituency. An additional 11% resided in SPA 4 (n=83), followed by SPA 2 (n=99, 13%), SPA 8 (n=63, 8%), SPA 7 (n=53, 7%), SPA 6 (n=31, 4%), SPA 5 (n=32, 4%), and SPA 1 (n=8, 1%). Thirteen cases (2%) resided in Pasadena.

Countries of Origin: The majority (n=704, 92%) of the HBsAg-positive women giving birth were born outside of the U.S. Of these women, 668 (95%) were known to be born in areas of the world with high or intermediate levels of endemic hepatitis B disease, such as Asia, Africa, Eastern Europe, Independent States of the former Soviet Union, Middle East, Pacific Islands, Caribbean Island, and several Central and South American countries.

ENHANCED CASE MANAGEMENT

In 2007, enhanced case management was completed for 732 HBsAg-positive mothers, their 744 newborns, and 1,205 household contacts. Case managers made numerous attempts to complete follow-up of mothers, infants, and household contacts. The majority (76%, n=556) of the HBsAg-positive mothers were reported in 2007. An additional 12% were reported in 2005 (n=90) followed by 2007 (n=85, 12%) with one case reported in 2003. One hundred thirty mothers were excluded for infant follow-up (86 mothers miscarried, terminated or had fetal demise, 9 transferred/moved out of LAC or were unable to be located before delivery, and 35 were retested and found to be HBsAg negative).

Enhanced case management protocol includes:

1. Providing education for HBsAg-positive pregnant women regarding HBV, liver disease, and possible transmission of the virus to household and sexual contacts,
2. Instructing HBsAg-positive pregnant women on the importance of protecting their infant against HBV by immunoprophylaxis and completion of the vaccination series,
3. Identifying and referring household and sexual contacts for screening and vaccination,
4. Notifying hospitals of expected deliveries and requesting hospitals return documentation after the infant's birth with specific dates and times post-exposure prophylaxis (HBIG and hepatitis B vaccine #1) was completed,
5. Advising the infant's health care provider regarding the need for hepatitis B vaccine #2 at 1 to 2 months and hepatitis B vaccine #3 at six months of age,

6. Reminding parents of the importance of completing the hepatitis B vaccination series, and
7. Consulting with pediatric health care providers to ensure post-vaccination serology testing for infants who completed their vaccination series.

Infant Immunoprophylaxis Completion Rates: Within the enhanced management, the majority of 744 eligible infants (including 12 sets of twins) born to 732 mothers received the hepatitis B vaccine #1 (n=720, 97%) and HBIG (n= 714, 96%) within 24 hours of birth. The majority of infants (n=686, 92%) received HBIG and a complete three-dose series of hepatitis B vaccine (Table 1).

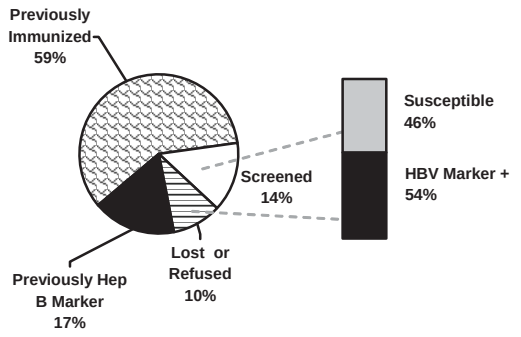
Table 1. Summary of Infant Hepatitis B Immunoprophylaxis, LAC—2007 (N=744)

Hepatitis B Immunoprophylaxis	# of Infants	Percent*
Received hepatitis B vaccine #1 ≤ 12 hours after birth	714	96%
Received hepatitis B vaccine #1 ≤ 24 hours after birth	720	97%
Received HBIG ≤ 12 hours after birth	702	94%
Received HBIG ≤ 24 hours after birth	714	96%
Completed HBIG/3-dose hepatitis B vaccine series	686	92%

* Percent of infants receiving hepatitis B immunoprophylaxis out of a total 744 infants born to 732 HBsAg+ mothers who completed follow-up in 2007.

Household and Sexual Contacts Completion Rates: A household contact was defined as an individual with anticipated continuous household exposure for greater than one year (often limited to nuclear family). Of 1,205 household and sexual contacts identified, 713 (59%) had already been vaccinated against hepatitis B, and 203 (17%) were known to have serologic evidence of hepatitis B infection. Of the remaining 289 (24%) contacts, 163 (14%) were screened for serologic evidence of hepatitis B infection or immunity, while 126 (10%) refused screening or vaccination, were lost to follow-up, or moved. Of the 163 (14%) household contacts that were serologically screened, 88 (54%) had positive markers for hepatitis B and therefore did not need vaccine. The remaining 75 (46%) household contacts were seronegative, and therefore, susceptible to hepatitis B infection (Figure 3). At the time of completion of case management for the HBsAg-positive mothers, 67 (89%) of these susceptible household contacts had completed all three doses of hepatitis B vaccine.

Figure 3
HBV Marker Status of Household Contacts to Cases Closed
LAC, 2007 (N=1,205)



Post-Vaccination Serology Results: Post-vaccination serology testing of infants born to HBsAg-positive mothers is recommended 3 to 18 months after completing immunoprophylaxis to verify efficacy of the hepatitis B immunoprophylaxis. Letters requesting post-vaccination serology results were mailed to pediatric health care providers of infants tracked by the PHBPP. Post-vaccination serology results were received for 193 infants screened in 2007. Of these, 171 (89%) had antibodies to hepatitis B surface antigen indicating protection against HBV, 2 (1%) were HBsAg-positive and infected, and 20 (10%) were negative for both markers and revaccination was recommended.

ADDITIONAL RESOURCES

Information from the CDC:

- General information – http://www.cdc.gov/vaccines/vpd-vac/hepb/; http://www.cdc.gov/hepatitis/index.htm
- Statistics and Surveillance – http://www.cdc.gov/hepatitis/Statistics.htm
- Perinatal hepatitis B vaccine recommendations - http://www.cdc.gov/mmwr/PDF/rr/rr5416.pdf

Additional information:

- Immunization Program's PHBPP website - http://lapublichealth.org/ip/perinatalhepB/
- Hepatitis B Foundation – http://www.hepb.org
- Asian Liver Center - http://liver.stanford.edu
- Immunization Action Coalition – http://www.immunize.org